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SENTENCE-COMBINING IMPROVES WRITING – CAN IT IMPROVE READING COMPREHENSION?

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Sentence-combining (S-C) as an instructional technique involves combining several kernel sentences into a longer, more complex sentence containing adjective and adverbial modifiers, phrases, dependent clauses, etc. S-C has recently been proposed as an instructional technique useful in improving student performance in writing and in reading comprehension. Research into the efficacy of this technique has already been conducted in the disciplines of English, social studies, science, and foreign languages. Logically, sentence-combining would appear to be applicable to any discipline which involves writing and reading skills.

The purposes of this paper are: (a) to provide badkground information containing an overviewof the theoretical base, an examination of the initial research in the field, and a definition and illustration of S-C as an instructional technique; and (b) to summarieze the results and analyze the methodology of the empirical research from 1968 to 1981, including data from a meta-analysis of the studies.

Background Information

S-C has its roots in the generative-transformational (g-t) theory of grammar as developed by Chomsky (1957). Two particular aspects of g-t theory led to the initial research in S-C. Chomsky hypothesized that there were two levels of language, the "surface structure" and the "deep structure." The surface structure consisted of the linear sequence of words, phrases, and clauses which constituted a sentence; the deep structure consisted of one or more underlying propositions, or units of meaning, which the surface structure represented. The relationship between deep structure and surface structure was not one-to-one since underlying propositions could be represented by a number of different surface structures. Secondly, Chomsky described the way in which surface and deep structures were related through transformations. One type of transformational rule designated the operations affecting two underlying propositions so as to join them or embed one in the other. O'Donnell, Griffin and Norris (1967) referred to these operations as sentence-combining transformations, because the effect was to produce one sentence where otherwise there would have been two.

Although Chomsky provided the theoretical base for S-C, it was Hunt (1965) who supplied the impetus and initial methodology for much of the subsequent research. In order to provide a systematic procedure for the quantitative analysis of syntactic structures, Hunt devised the "minimal terminable unit," or "T-unit," which he defined as "one main clause plus the subordinate clauses attached to or embedded within it" (p. 49). In his study of syntactic development in the writing of schoolchildren between grades 4 and 12 and in the writing of skilled adults, Hunt found that older writers used a much larger number of sentence-combining, sentence-embedding transformations per T-unit than did younger writers. Although Hunt did not attempt to validate S-C as an instructional strategy, he suggested the possibility that a "sentence-building program" could be designed to promote the attainment of the developmental stages in syntactic maturity which he had identified.

Following Hunt's suggestion, Mellon (1969) explored the effects of transformational S-C practice on the development of syntactic fluency in English composition of seventh-graders. However, Mellon also gave his experimental group instruction in g-t grammar terminology. Thus, while the results did indicate a growth in syntactic fluency, the relative contribution of learning the g-t terminology and of the practice in S-C to that growth was not clear.

In order to examine the effects of S-C practice alone, O'Hare (1973) disposed of the teaching and use of grammatical terminology in performing combining operations by devising a method of providing written cue words for selected types of S-C transformations. O'Hare's experimental group of seventh graders experienced highly significant growth at the .001 level on all measures of syntactic maturity.

The two types of S-C exercises most used since 1973 have been modeled after the methods proposed by O'Hare (1973) and Strong (1973). O'Hare's method has been designated as "signaled" S-C exercises. In the example which follows, the A form is the S-C problem and the B form is the acceptable student answer.

A. Edna was amazed at SOMETHING.
Ron had forgotten the combination. (THE FACT THAT)
B. Edna was amazed at the fact that Ron had forgotten the combination.
A. Julio should admit SOMETHING.
He was there. (THAT)
B. Julio should admit that he was there. (O'Hare, 1975, p. 20)

As an alternative to O'Hare's "signaled" method, Strong (1973) developed what he termed "open" S-C exercises. Kernel sentences were presented in clusters but without signals to indicate the particular transformations to be used, or even which of the sentences to serve as the base clause. Students were told to combine the kernel sentences into complex sentences; versions generated by different students were then compared. Here is an example.

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1. The singer was young.
2. The singer was swarthy.
3. He stepped into the spotlight.
4. The spotlight was red.
5. His shirt was unbuttoned.
6. The unbuttoning bared his chest.
7. Sound ballooned around him.
8. The sounds were of guitars.
9. The sounds were of drums.
10. The sounds were of girls.
11. The girls were screaming.

One student might generate the following: "The singer, who was young and swarthy, stepped into the red spotlight. His unbuttoned shirt bared his chest. Sounds of guitars, drums, and screaming girls ballooned around him." Another student might combine all 11 sentences into one sentence: "As the sounds of guitars, drums, and screaming girls ballooned around him, the young, swarthy singer stepped into the red spotlight, his shirt unbuttoned, baring his chest" (Strong, 1976, p. 62-63).

Review of Research

The literature search resulted in locating 20 studies[1] reported from 1968 to 1981 which had used S-C as a treatment to improve written composition, reading comprehension, or both. Fourteen of the studies were concerned with the effect of S-C training on written composition only, with four containing measures of both writing and reading. Only two studies examined S-C's effect on reading comprehension alone.

Of the 20 studies examined, 19 contained subjects which ranged in age from grade 4 through college freshmen, and one study used Chinese students of unspecified adult level. Eight of the studies used subjects in grades 7-9, seven used college freshmen, and three used subjects in grades 4-6. One researcher,

Fisher (1973) used subjects in grades five, seven, and nine.

The studies generally suffered from several validity threats common to educational studies conducted in field settings. The samples used were, almost always, selected on the basis of convenience and/or availability. In fact, 17 of the studies did not specify how the samples were chosen, and in only one (Mellon, 1969) was any serious attempt made to claim representativeness.

Another validity threat common to this research was the method of assignment to treatment and comparison groups. Three of the studies used a single group design, eight used intact classes, three used a matched pair technique, one used matched groups, and only five used a random assignment technique.

The statistical technique represented most often in the twenty studies was the *t* test. It was used by nine of the researchers while ANOVA was used by four and ANCOVA by five. One study used a regression analysis and one did not specify the statistical procedure used. A clear weakness in relating statistical procedure to overall design is seen when one finds that, of the eight researchers using intact groups, three used inappropriate statistical procedures, i.e., *t* test or ANOVA. The others used the appropriate technique, ANCOVA.

The treatment time was also of interest. In several studies it was rather difficult to estimate. In only one study (Ney, 1976), however, was it not possible to make some calculation. The length of the treatment ranged from 20 minutes to 8 months, although most were more than 10 weeks. It was not possible to compute treatment times in the same units of measure so that more precise comparisons could be made. Also, it should be noted that 17 of the 20 treatments occurred within regular classrooms, decreasing the threat of novelty/description effects when applying these results to classroom practice.

In order to synthesize the results of this research a meta analysis was completed. Meta analysis is a procedure first suggested by Gene Glass in which the results of the studies were converted to effect sizes (ES). The ES is an expression which compares the gain made by the treatment group to that made by the comparison group. The simplest mathematical expression of ES is: $ES = \frac{\bar{X}_T - \bar{X}_C}{SD_C}$ (McGaw & Glass, 1981). Thus, an ES of .73 would indicate that the treatment group made .73 standard deviations of progress more than the comparison group, while an ES of (−.73) would indicate the same amount of progress, with the comparison group exceeding the treatment group. It should be noted that in several of the following analyses the number of ES's were too small to provide valid results. However, the analysis was completed because the results could be valuable in generating hypotheses regarding the comparisons.

Table 1 shows the results of the computation of ES for several groups of studies. The purpose of the first group of ES's for writing and reading was to ascertain the overall effects of S-C as a treatment. To accomplish this, *t* tests for the differences between a sample mean and a population mean were computed. Since both of the *t* values related to writing were clearly less than the acceptable .05 level of significance, it seems safe to conclude that S-C has been effective as a measure to improve written composition. Also, the *t* value for reading with immediate recall was significant. However, the number of ES's available for analysis of the delayed measures of writing and for both reading measures was rather small, suggesting the need for continuing substantiation of S-C effectiveness in these areas.

A second question which was of interest was whether or not certain writing and/or reading measures resulted in ES's which were different from each other. Four types of writing measures were compared through ANOVA and a non-significant F ratio resulted. Two types of reading measures were also examined, and it was found that the mean ES of the cloze measures was not significantly different from the mean ES of the standardized test measures. In both analyses the number of the ES's was small.

When a comparison of the three varying grade level classifications was made through ANOVA, followed by a Duncan Multiple Range Test, it was found that the mean ES for Grades 7-9 was significantly higher than that of the other two levels. There was no difference between the means of the College Freshmen and the Below Grade 7 classifications.

The final comparison was among the various types of comparison groups used, and it resulted in a non-significant F ratio. Here, again, the small number of ES's for some types of design would lead one to question the validity of this F ratio.

In summary, it appears that S-C has been shown to have a positive effect on written composition when the criterion measure is taken immediately upon completion of the treatment. The effect of S-C on reading comprehension is not as clear. While the mean ES was significant, there were only five studies and 17 ES's available for analyses and, of the 17 ES's, only six were significant. Several individual researchers who used standardized tests suggested that these tests did not measure the types of comprehension most likely to be affected by S-C practice. The research techniques used in these studies often failed to exercise rigorous controls over internal validity threats. Of the twenty studies examined, only ten used designs which would control adequately for internal threats. These ten studies used either random assignment to groups or intact groups with an ANCOVA statistical analysis. While it would be very desirable to achieve more representative samples, it seems unlikely that this weakness will be remedied in future research because of the realities of conducting research in schools. However, it would behoove future researchers to provide more complete descriptions of the samples used, regardless of the method of selection.

REFERENCES

Chomsky, N. *Synactic structures.* The Hague: Mouton, 1957.

Combs, W. E. Further effects of sentence combining practice on writing ability. *Research in the Teaching of English,* 1976, *10*(2), 137-149.

Combs, W. E. Sentence-combining practice: Do gains in judgments of writing "quality" persist? *Journal of Educational Research,* 1977, *70*(6), 318-321.

Cooper, T. C. *Developing syntactic fluency of college foreign language students through sentence-combining practice and manual of instructional materials for sentence-combining practice.* New York: EXXON Education Foundation, 1978. (ERIC Document Reproduction Service No. ED 166 991)

Cooper, T., & Morain, G. A study of sentence-combining techniques for developing written and oral fluency in French. *French Review,* 1980, *53*(3), 411-423.

Fisher, K. D. *An investigation to determine if selected exercises in sentence-combining can improve reading & writing.* Unpublished doctoral dissertation, Indiana University, 1973.

Haswell, R. H. Within-group distribution of syntactic gain through practice in sentence-combining. *Research in the Teaching of English,* 1981, *15*(1), 86-96.

Hughes, T. O. *Sentence combining: A means of increasing reading comprehension,* 1975. (ERIC Document Reproduction Service No. ED 112 421)

Hunt, K. W. *Grammatical structures written at three grade levels* (Research Report No. 3). Champaign, IL: National Council of Teachers of English, 1965.

Karl, H., & Blair, R. D. *The comparative effects of a sentence combining activity and four other modes of information presentation on the verbal memory of eighth graders.* Unpublished manuscript, University of South Florida, 1980.

Larkin, G., & Shook, R. *Interlanguage, the monitor, and sentence combining.* Paper presented at the Los Angeles Second Language Research Forum, Los Angeles, CA, October 1978. (ERIC Document Reproduction Service No. ED 169 779)

Maimon, E. P., & Nodine, B. F. Measuring syntactic growth: Errors and expectations in sentence-combining practice with college freshmen. *Research in the Teaching of English*, 1978, *12*(3), 233-244.

McGaw, B., & Glass, G. U. Choice of the metric for effect size in meta-analysis. *American Educational Research Journal*, 1980, *17*(3), 325-327.

Mellon, J. C. *Transformational sentence combining: A method for enhancing the development of syntactical fluency in English composition* (Research Report No. 10). Urbana, IL: National Council of Teachers of English, 1969.

Melvin, M. P. *The effects of sentence combining instruction on syntactic maturity, reading achievement, and language arts skills achievement*, 1980. (ERIC Documet Reproduction Service No. ED 191 007)

Miller, B. D., & Ney, J. W. The effect of systematic oral exercises on the writing of fourth grade students. *Research in the Teaching of English*, 1968, *2*(1), 44-61.

Morenberg, M., Daiker, D., & Kerek, A. Sentence combining at the college level. *Research in the Teaching of English*, 1978, *12*(3), 245-256.

Ney, J. *Sentence combining and reading*. Tempe, AZ: Arizona State University, 1976. (ERIC Document Reproduction Service No. ED 161 080)

O'Donnell, R. C., Griffin, W. J., & Norris, R. C. *Syntax of kindergarten and elementary school children: A transformation analysis* (Research Report No. 8). Champaign, IL: National Council of Teachers of English, 1967.

O'Donnell, R. C., & King, F. J. An exploration of deep structure recovery and reading comprehension skills. *Research in the Teaching of English*, 1974 *8*(3), 327-338.

O'Hare, F. *Sentence combining: Improving student writing without formal grammar instruction* (Research Report No. 15). Urbana, IL: National Council of Teachers of English, 1973.

O'Hare, F. *Sentence craft: An elective course in writing*. Lexington, MA: Ginn & Company, 1975.

Pederson, E. L. *Sentence-combining practice: Training that improves student writing*. Weber State College, 1979. (ERIC Document Reproduction Service No. ED 169 567)

Stewart, M. F. Freshman sentence combining: A Canadian project. *Research in the Teaching of English*, 1978 *12*(3), 257-268.

Strong, W. *Sentence combining: A composing book*. New York: Random House, Inc., 1973.

Strong, W. Close-up: Sentence combining—Back to basics and beyond. *English Journal*, 1976, *65*(2), 56, 60-64.

Swan, M. B. Sentence combining in college composition: Interim measures and patterns. *Research in the Teaching of English*, 1979, *13*(3), 217-224.

[1]A list of the 20 studies may be obtained from the authors.

Table 1

RESULTS OF EFFECT SIZE FOR SELECTED VARIABLES IN S-C RESEARCH

Variable	XES	St. Dev.	No. ES	No. Studies	Results of Analysis	df p level
Writing: Immediate Recall	.764	.736	84	16	t = 9.55	df = 83; p < .001
Writing: Delayed Recall	.649	.050	7	3	t = 5.41	df = 6; p < .01
Reading: Immediate Recall	.357	.545	17	5	t = 2.75	df = 16; p < .02
Reading: Delayed Recall	.179	.240	8	1	t = 2.08	df = 7; p < .10
Writing Measures						
Commonly Used Words/ T Unit	.975	.800	16	9	F = 1.54	df 3, 47; p = NS
Words/Clause	.617	.472	17	9		
Clauses/T Unit	.600	.718	11	5		
Holistic	1.186	1.057	7	5		
Reading Measures						
Cloze	.504	.814	4	3	F < .10	df=1,11; p = NS
Standardized Tests	.341	.341	9	4		
Grade Level of Sample						
Below Grade 7	.521	.421	12	3	F = 7.19	df 2, 89; p < .01
Grades 7-9	1.075	.929	36	6		
College Freshmen	.536	.394	44	7		
Type of Design						
No Comparison Group	.863	.645	7	2	F = 1.52	df 4, 107; p = NS
Matched Pairs	1.079	.965	10	3		
Random Assignment	.657	.870	41	5		
Intact (ANCOVA)	.526	.475	37	5		
Intact (ANOVA or *t*)	.559	.269	17	3		

A DESCRIPTION OF INSTRUCTION IN THE READING OF ASSIGNED MATERIALS IN EIGHTH GRADE SOCIAL STUDIES AND LANGUAGE ARTS CLASSROOMS

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This study is an outgrowth of two papers presented at the American Reading Forum in December, 1980. The first was a study (Hesse, Bullock, and Chin, 1980) in which a product-centered approach to reading comprehension was discussed. This approach focused not upon a series of skills, but on "those products of reading that teachers will accept as evidence that the material is being read and students are gaining meaning from the material." Reading for meaning is seen as active reading, and the behaviors of students so engaged are defined as active reading behaviors. This follows Goodman's model (1970) of reading that looks at meaning as the end product of the reading process.

The authors cite important reasons for acceptance of this approach to content area reading. First, this approach allows teachers to be more specific about what they need to do in order to help students with reading the material. If they know what behaviors to expect from a student who is reading, teachers will be better able to help the student learn to exhibit those behaviors. For example, if the ability to summarize can be accepted as evidence that the student has read and understood a passage, the teacher can (1) observe whether students can summarize, and (2) devise strategies for helping those who cannot. "These products of active reading would appear to be more manageable and remove some of the mysticism from the teaching of reading in the content areas" (Hesse, Bullock, and Chin, 1981).

In the second paper (Hesse and Slinger, 1980), a model was developed by which baseline data could be collected with regard to the amount and type of active reading behaviors (pupil reading pursuits) that might be observed in the content area classroom. "At the present time, reading educators and school administrators lack a clear set of expected/desired student behaviors in content area reading. In addition, we have no way of assessing the teaching of these reading behaviors. Hopefully, the framework we describe will be a step toward gathering data that will be helpful in reviewing and setting defensible policy in secondary content area reading instruction" (Hesse and Slinger, 1981).

Reason for the Study

One of the major concerns of education continues to be the apparent decline in reading competency among high school graduates. This concern has led to an increased emphasis on "back to basics," and has served to expand the area of responsibility for reading instruction from the exclusive domain of the elementary school reading class to every situation where reading assignments are required. Since these situations include secondary classrooms, a new emphasis has been placed on reading at the secondary level.

Twenty-eight states now mandate that preservice instruction for all secondary teachers shall include attention to reading in the content area (Thomas and Simpson, 1979). These mandates are based on the following assumptions:

1. The range of reading levels in a given classroom can span many grade levels. Few schools can afford to hire reading teachers to accommodate every student whose skills need improvement. The most economical way of providing this instruction is to include it in the students' regular classes.
2. Even students who can decode every word in their text may sometimes fail to grasp the meanings of new and unfamiliar concepts that are presented in the reading assignment. Each subject area contains a vast number of concepts that the student need to learn. The content area teacher cannot hope to teach them all. The best a teacher can do is to help students acquire the skills necessary for independent learning.
3. Reading skills taught in the laboratory setting do not automatically transfer to the situation where they are to be used. Each skill should be taught or reinforced in the content area reading assignment where it is needed.

However, as Palmer (1975) suggests, many teachers hold the view that "the teaching of reading in the content area is an esoteric mystery to be solved only by the reading specialist" (p. 43). These teachers believe that before they can help students learn to read, they must be trained as reading specialists. Secondary teachers often view reading as a set of skills that must be taught prior to content area instruction. This view allows them to see only the remedial aspect of reading instruction, and since they have not usually been trained in remedial reading, they feel inadequately prepared to meet the challenge. This lack of confidence in their ability to teach reading, coupled with the increasing demands for reading instruction, can create negative attitudes on the part of these teachers which, in turn, can affect student performance. A change in these attitudes may occur when teachers learn to view reading as a tool needed to facilitate the learning of content, and not as an intrusion into their own domain. The building of competence in reading instruction and the improvement of attitude can come about through well-designed inservice programs. However, before these programs can meet the needs of teachers, they must be based on a knowledge of what is presently happening in the secondary content area classrooms. Educators must know the specific things that teachers do to assist students in reading content area assignments. It was in response to this need for information about secondary reading instruction that this study was designed.

Since there was no effective instrument available, one was designed for this study which is capable of collecting information about the kind, quantity and duration of content area reading activities that might be observed in the secondary classroom.

Building the Framework

Step 1. In order to build a framework it was first necessary to define content area reading in terms of classroom activities. Initially, a series of classrooms were observed and all activities recorded. These activities were placed into categories labeled reading pursuits, content instruction, and non-instruction. Reading pursuits were then sub-grouped as active reading pursuits, passive reading pursuits, and oblique reading pursuits. Each of these in turn was clarified as additional subsets of pursuits were identified.

I. Non Reading Related Pursuits
   A. Teaching-learning content
   B. Non instructional
II. Reading Related Pursuits
   A. Active Reading Pursuits
      1. Pre teach reading vocabulary
      2. Pre teach reading or study skills
      3. Providing background information for reading
      4. Student reads with direct teacher instruction
      5. Student practices skills or shows evidence of active reading behaviors taught
   B. Passive Reading Pursuits
      1. Student reads silently using teacher prepared study material

2. Student reads silently using non-teacher prepared material

C. Oblique Reading Pursuits
1. Student reads orally
2. Teacher reads orally
3. Skills taught in isolation
4. Review, assessment of reading

To qualify as an active reading pursuit, an activity must take place in preparation for, or during, reading. The reading must be done in content related material and direct instruction must be given by the teacher.

Passive reading pursuits are those in which students are engaged in a reading activity for which no preparation or direct instruction is given. Material may or may not relate to content.

Oblique pursuits are those which are only indirectly related to content area reading or whose relationship is obscure. These activities lack one or more of the qualifications for active reading pursuits. For example, reading skills may be taught independent of any subject matter assignments; students or teacher may read orally without attention to reading behaviors, or the interaction may take place after the student has read the material.

Step 2. Once the activities which would be accepted as the active, passive, or oblique reading pursuits were identified and defined, an observational scale was designed. Since the data analysis was to involve the computation of percentages of total class time spent in teaching reading, a continuous real time measurement system was used. This type of measurement occurs when every duration of behavior is recorded during an observation session. Probe sampling was considered as a coding strategy, but rejected because it is insensitive in detecting activities which occur infrequently. In teaching a reading skill, duration of that instruction may be more meaningful than frequency. Merely "mentioning" the meaning of a vocabulary item may rate a frequency count, but may do little to help students learn the word. The coding instructions were designed to make recording as simple as possible. Time was recorded at the beginning of each new activity. The categorization scheme allowed observers to be objective about the coding of pursuits; this kept observer inference at a minimum and enhanced observer agreement. Data extracted from each observation included: (1) the type of activity that was observed, (2) the frequency and duration of each, and (3) who participated in the activity.

Method

Subjects of the study were all eighth grade language arts and social studies classrooms in one local school district. In the four middle schools in this district, eighth grade language arts and social studies classes are combined into two-period blocks. Thirteen teachers are responsible for teaching these blocks; each teacher teaches both the social studies and language arts classes of a block. In most instances, the block is treated by teachers as two separate subjects, and no attempt is made to integrate the curriculum of the two subjects.

Six graduate students in education were recruited and trained to conduct the observations. A manual was prepared to assist observers with defining and categorizing the reading activities. Observers randomly selected the times during which the observations would be made within a given period of time.

Results

Major findings from the data are as follows:

1. Total observed time for the four schools was 3546.5 minutes, or 59.1 hours. Less than 0.9% of the total observed time was spent in active reading pursuits. This represented an average time of five minutes for each two-period block. Block times ranged from 80 to 100 minutes.
2. In the observed classrooms, reading made up 51% of the average eighth grade student's class time. The largest portion of this time (28.1% or 998.6 minutes) was spent in silent reading, mainly written assignments, in which students read a text and answered questions about what they had read or worked on written reports. Oblique reading behaviors made up another 17.4% of this 51% figure. These findings confirmed the observations of Durkin (1978) in whose study written assignments dominated the teaching scene.
3. Five percent of the total observed time was devoted to content area reading instruction, with the majority of this time being spent in "Student Reads, Teacher Provides Instruction." Very little time was spent in preteaching vocabulary or preteaching reading skills (0.8% or 27.3 minutes), although several teachers provided background information before the students read.
4. Non-instructional activities consumed 15% of the time, nearly three times as much of the observed time as content area reading instruction.
5. One school accounted for more than half of the reading instruction observed. In this school, 14% of the total class time was devoted to reading instruction, and all teachers spent some time in these activities. Block teachers spend time working together to plan their language arts/social studies classes, and some of this planning time is spent developing methods for helping students read the assignments.
6. Eighteen percent of the teachers were able to approximate the amount of time that they would spend in preparing students to read homework assignments. The teachers who estimated correctly predicted that they would spend no time on this activity, and, in fact, they did not. Thirty-one percent of the teachers were able to give a good estimation of the amount of time that they would spend preparing students for, or helping students with, in-class reading assignments.
7. Teachers with five years or less of teaching experience provided twice the amount of reading instruction as teachers with more than five years' experience.

Implications for Educational Practice

The definition of reading that places emphasis on "teaching content" rather than on "teaching skills" adds a new perspective to secondary reading programs. Teachers may now view reading, not as a separate subject, but as a tool needed to facilitate the learning of a content. It would seem that content area teachers would be uniquely qualified to provide students with motivation and purpose for reading in the field that they have chosen. Since it is assumed that content teachers can read well the material of their subject, they are also qualified to recognize the reading behaviors that indicate that a student is (or is not) handling the material efficiently. "As sophisticated learners, they know how to read selectively—how to distinguish key ideas from supportive evidence; major from minor points" (Cunningham, p. 380). Teaching reading skills in the situation in which they are used is economical, since this type of instruction utilizes the training that the teachers have already received.

This view of reading also shifts some of the duties of the reading specialist from teaching classes of remedial reading students to providing resources and information on reading to the rest of the teaching staff. As Robinson (1975) pointed out, "Certainly reading or language arts specialists are aware that reading cannot be set aside as an isolated entity; they know that the reading process(es) can only exist in relationship to content" (p. 3).

REFERENCES

Cunningham, D. Selective reading guide-o-rama; the content teacher's best friend. *Journal of Reading*. February 1975.

Durkin, D. What classroom observations reveal about reading comprehension instruction. *Reading Research Quarterly*. 1978-1979, (4).

Goodlad, J., and Klein, M. *Behind the classroom door*. Charles A. Jones Publishing Co., 1970.

Goodman, K. Behind the eye: what happens in reading. In *Reading process and program*, edited by K. Goodman and O. Niles. NCTE, 1970.

Hesse, K., Bullock, T., and Chin, B. Active reading behaviors: a product centered approach to comprehension. In *Comprehension: process and product—American Reading Forum yearbook*, edited by G. McNinch. 1981.

Hesse, K., and Slinger, E. Pupil reading pursuits in content area classrooms: data needed by policy makers. In *Comprehension: process and product—American Reading Forum yearbook*, edited by G. McNinch. 1981.

Robinson, H. *Teaching reading and study strategies: the content area*. Boston: Allyn and Bacon, 1975.

Thomas, Keith J., and Michele Simpson, "Reading Requirements and Basic Certification: An Update." *Reading Horizons*, 1979, 20, pp. 20-26.

Palmer, William S. "Teaching Reading in Content Areas," *Journal of Reading*, October, 1975.

A QUALITATIVE ANALYSIS OF READING INSTRUCTION IN LOW LEVEL LANGUAGE ARTS AND READING CLASSES IN ONE HIGH SCHOOL

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In 1981 more college textbooks dealing with teaching reading in the secondary school appeared on the market. Revisions of earlier versions only five to seven years old have been heralded as new and exciting. A new twist here and there is noted by the addition of terms in titles like "middle school," "middle grades," and "integrated." The Great America Reading Machine is functioning predictably!

In the secondary schools some trends are observable. While ten years ago few special education, remedial or developmental reading classes were in existence and the push was for every teacher to be a teacher of reading, today content area reading fervor has subsided. Today reading specialists coexist with the special education teacher, each teaching their respective portion of the students scoring in the first three stanines on standardized reading tests. The special education teacher, given the paperwork and referral system of 94-142, has fewer students. The reading teacher is a person without a home, with one foot in the special services department and another in the English area. In a few schools the reading specialist has advanced study skills or efficient reading classes and the "low level kid" stigma is reduced. In some other situations the reading specialist has some "released" time to serve as a reading consultant to other teachers. But entry into other classrooms is often painful.

In some junior high/middle schools the reading instruction is carried by "core" teachers through the use of the basal reading series that now have been adopted up through grade eight. Schools' goals and statements of philosophy make strong statements about reading throughout the curriculum, but the rhetorie is usually empty.

Some school building reading plans have been created for central office consumption, and 20 minutes a week of SSR, Sustained Silent Reading, has salved a few souls. Requests for inservice on secondary reading have trickled to a halt.

And what is happening in the classroom behind closed doors? What could be happening? What should be expected or demanded? Is content area reading a reality or a pipe dream?

In order to answer some of these questions Hesse and Bullock (1981) suggest "products of active reading" be taught and encouraged by content area teachers. These observable products of active reading were suggested because they would serve as proof that a student was processing the material in order to make meaning.

Wittrock's (1974) generative model of learning, which grew out of a decade of research on transfer of learning, gave rise to his Generative Model of Comprehension. This model posits that sentences are retrieval cues used to retrieve memories of earlier experiences. From these memories the reader generates or infers meaning from the text. The generated meanings represent comprehension of the meaning. In a series of studies (Marks, Doctorow, Wittrock, 1974; Wittrock, Marks, and Doctorow, 1975; Doctorow, Wittrock, and Marks, 1978) comparisons of predictions from generative models and other models were made. In the 1978 study, retention and comprehension were facilitated when students actively constructed meaning from the text. The constructed meaning was triggered when students were asked to generate summarizing sentences using high frequency vocabulary from the text that served as semantic retrieval cues. These cues facilitated recall of information relevant for the construction of meaning from the text.

Even though this experimental research on reading comprehension added future validation to the active reading behaviors advocated by Hesse and Bullock, there still was little information available on the kind and quality of pupil pursuits—reading or otherwise—in content area classrooms. Policy makers, administrators, reading specialists and content teachers still had no baseline data from which instruction decisions could be mandated or encouraged.

Slinger and Hesse (1981) developed and proposed the use of an observational scale that would allow researchers and practitioners to gather data on the kind and quantity of pupil reading pursuits in content area classrooms. Bullock, Slinger, and Hesse (1981) developed and proposed the use of an observational scale that would allow researchers and practitioners to gather data on the kind and quantity of pupil reading pursuits in content area classrooms. Bullock, Slinger, and Hesse (1981) reported on the data gathered in eighth grade language arts and social studies classrooms. While no judgements were made on the amount of time spent in active reading, passive reading, oblique reading, non-reading, and non-instructional pursuits, the percentage of time spent in active reading pursuits seemed small.

In order to better understand the earlier data and to test the usefulness of the Pupil Reading Pursuit Observational Scale, the study reported here was conducted.

Purpose of Study

The study had three purposes. First was to determine the kind and quantity of pupil reading and non-reading pursuits in high school reading and language arts classrooms. Bullock, Slinger, and Hesse (1981) had gathered baseline data in eighth grade language arts and social studies and a comparable set of data was desired. The second purpose was to test the utility of the Pupil Reading Pursuits Observation Scale and the data it yielded. It was known the scale could be used in a social studies class, but the problems encountered in a language arts class still remained. In addition, while the scale had been designed to assess reading pursuits in a content class, we were curious as to whether or not it could be used to assess the kind and quantity of content reading instruction in a non-content class—reading.

The third purpose was to suggest modifications in the scale and to establish a more definitive scale user's guide.

Classes to be Observed

One four-year high school of 1400 students in a suburban Oregon community was selected. Students in the high school are grouped for instruction in Language Arts and Reading by performance on standardized reading tests and performance assessment by previous language arts teachers. At the time observations were made, there were:

- 14 sections of low level language arts classes—students in stanines 4 and 5.
- 32 sections of regular language arts classes—students in stanines 6 through 8.
- 2 sections of advanced language arts classes—students in stanines 8 and above.
- 8 sections of special reading classes with students who were in stanines 2, 3, and 4.

The students in the reading classes were taught by certified reading specialists who were affiliated with the Special Services Department. They also took other language arts classes which were taught by certified language arts teachers.

Our focus within these four groups became the fourteen low level language arts classes and the eight reading classes. The fourteen sections of language arts were taught by seven different teachers. We selected five classes taught by five different teachers. Each class of fifty minutes was observed three times over a two-week period. The eight reading classes were taught by two teachers. Both teachers were observed three times in one of their reading classes.

The five language arts teachers reported their instructional plans in the classes observed were similar or identical to their own parallel sections that were not observed. The reading teachers team planned with precision and while only one of four ninth grade reading classes was observed, the activities in the other three on any given day would have been the same even though the exact allocation of minutes may have varied. Thus we assumed we had selected an adequate sample of the low level language arts and reading classes.

Observation Scale

The observation scale, the same one used in Bullock, Slinger, and Hesse (1981) study of eighth graders, was essentially identical to the scale suggested and described in detail in Hesse and Slinger (1981). The categories used in the scale can be seen in the presentation of data in Table 1 and each category is described in Hesse and Slinger (1981) and Slinger (1981).

Training of Observers

Two observers were used. One was one of the original designers of the scale and the other was a reading specialist from the high school in the study. The two observers studied the written description of the categories contained in Hesse and Slinger (1981) and Slinger (1981). They then met with others who had used the scale to discuss instances and non-instances of instruction that would fit each category. This was followed by use of the scale in a pilot class and a subsequent discussion and verification of data from the pilot observations.

The Observation Schedule

The twenty-one observations of 50 minutes duration were made over a two-week period of time. Teachers observed were contacted prior to the observation period, the study was explained in general terms, and permission to observe was secured. While each teacher knew they would be observed three times during the two-week period, the actual days of observation were not known in advance.

Each period of observation began and ended on the minute and second class was scheduled to begin and end. The observation scale is designed so the observer records the time any student or teacher activity is initiated. In addition each activity is briefly described. Within a few hours of each observation, the description of each activity was shared with the second observer who validated or challenged the categorization that was used. The challenged categorizations were resolved through discussion which had as its primary aim consistency of categorization.

Results

Five language arts teachers were observed for three fifty-minute class periods. The total number of minutes observed was 750. Two reading teachers were observed for three casses for a total of 300 minutes.

Only six of the fifteen language arts classes—numbers 1, 2, 4, 10, 11, 12—had any activities in the reading categories and all six reading classrooms had activities distributed in the reading categories. A great majority of the language arts classrooms had more than thirty of each 50 minutes spent in non-reading content activities. While all classes had non-instructional time, the range varied from 1½ minutes to 18¼ minutes per 50-minute class period.

In Table 1 the percent of time spent in language arts and reading classrooms in each of the five major Pupil Pursuits is presented.

The data reveal considerable difference in time spent in the various categories and across classrooms. Students in language arts classrooms spent 10% of the time in active reading as compared to 50% in the reading classes. The total amount of time spent in reading, a sum of the first three categories, is 21% in language arts classes and 93% in reading classes. Also of note is the difference in non-instructional time, 22% compared with 7%.

Discussion

When comparing the results of this study with the Bullock, Slinger, and Hesse (1981) study, two things are interesting. The language arts classes' total percent of time spent in content activity, in noninstructional reading, and in passive reading are quite similar, 77% compared to 79%. While in this study very little time, 2%, was spent in passive reading, this percent would have increased if one of the teachers had run class in his usual fashion which was to give the students the entire period to read from their library books. But, as he explained to the observer, "I decided to teach today so you could have something to observe. Usually I just let the kids read. It give them a break and me a break, too. I do this every Friday."

In the language arts classes, given the amount of time observed in noninstructional activities, the low skill level of the students, and the low percent of time spent on any reading at all, it seems students would benefit by a restructuring of class time and priorities incorporating more reading behaviors. It seems as if the teachers in these language arts classes have designed a "reading free curriculum." This does not have to be the case. The reading teachers, in contrast, have a definite content as well as reading. Their secret to success lies in the following:

First, they have effective classroom management skills. Students move purposely and quickly from one activity to another. Structure is a given. Class activity begins on the minute it is supposed to. Expectations are clear, and the students respond accordingly.

Second, they are free to choose their own content—as long as they teach reaching. Given that, they choose to teach reading not as a set of isolated skills on worksheets, but as comprehension, thinking, and study skills. They have the freedom to decide what their students need to know to survive in school and the world and then develop their own materials accordingly. They use a minimum of commercially prepared reading materials and thus they breathe their own life into the content.

Third, they talk about units of instruction—their content—

rather than the skills or processes they teach. For instance, they speak of the "hero unit" or the "newspaper unit" or the "logic unit." Conversely, language arts teachers speak in terms of skills—spelling, vocabulary, writing, punctuation. They have no vehicle to carry their skills. The reading teachers do. Consequently, they have more content reading. If they taught skills rather than units, they would have had a considerbly greater amount of their time spent in the "teaching skills in isolation" category, an oblique reading category, rather than an active reading category.

Table 1

PERCENT OF TIME BY GENERAL PUPIL PURSUITS AND CLASSROOM CLASSIFICATION

	Classrooms	
Pupil Pursuits	**Language Arts**	**Reading**
Active Reading	10%	51%
Passive Reading	2%	0%
Oblique Reading	9%	43%
Non-Reading Content Activity	57%	0%
Non-Instructional Activity	22%	7%

Many nonreading issues surfaced and should be considered along with the data that is presented. Should curriculum be mandated for low level language arts classes and, if so, should that curriculum be a set of worksheets teaching skills in isolation? Does teaching adverbs and paragraphing have academic value for students who can barely construct a sentence? We are in the throes of a "no fault" syndrome where everybody loses. Teachers see students as dumb and unmotivated because the things being taught are inappropriate. So both teacher and student feel like a failure. Department heads and building administrators mandate a curriculum that they believe appropriate and meet with unhappy faculty and lowering test scores. Central office personnel managing curriculum from a distance respond to a competency base model mandated by the state and previous promises made to the public. Most teachers with low level classes have developed a teaching style that is appropriate for average and above average students. They use classroom management techniques that work with the mature students and do not easily shift expectations and structure for the low level class. The adjustments that are made are usually in an effort to "let up" on the students. Letting up results in teachers reading, a reliance on discussion, films, worksheets, and other strategies that are not dependent upon the students reading either in or out of class.

While this study was intended to only gather descriptive data about what was happening in reading and low level language arts classrooms and no attempt was made at measuring student gain, the teachers in this study were advised to examine the results of Stallings (1979) when she reported, "In each year of the study, we found students made more gain in classrooms where teachers spent more time instructing, discussing homework, providing considerable supportive feedback adnd having students read aloud in small groups. Students made less gain in classrooms where 40-50% of the time was allocated to written assignments, another 30-40% of time was allocated to silent reading and teachers graded papers or made lesson plans during class time." It seemed to these authors that an optimum amount of time in active reading and in some of the oblique pursuits would be desired. Given this awareness, it was felt the informed language arts or the reading teacher could, with appropriate collegial and administrative support, examine their own use of classroom time and adjust their teaching strategies so students would increase their likelihood of reading gain.

REFERENCES

Bullock, T. and Hesse, K. D. Reading in social studies. *National Education Association*, 1981.

Bullock, T., Slinger, E., and Hesse, K. D. A description of instruction in the reading of assigned materials in eighth grade social studies and language arts classrooms. Paper presented at the American Reading Forum, December 1981.

Doctorow, M., Wittrock, M. C., and Marks, C. Generative processes in reading comprehension. *Journal of Educational Psychology*, 1978, *70*(2), 109-118.

Hesse, K. D. and Slinger, E. Pupil reading pursuits in content area classrooms: data needed by policy makers. In *Comprehension: process and product—first yearbook of the American Reading Forum*, 1981.

Marks, C. B., Doctorow, M. J., and Wittrock, M. C. Word frequency and reading comprehension. *Journal of Educational Research*, 1974, *67*, 259-262.

Slinger, E. L. A systematic observation of the extent to which students in secondary content area classrooms are given instruction in reading assigned material. Unpublished doctoral dissertation, University of Oregon, Oregon, 1981.

Stallings, Jane. "How to Change the Process of Teaching Basic Reading Skills in Secondary Schools," SRI International, Menlo Park, CA, 1979.

Wittrock, M. C. Learning as a generative process. *Educational Psychologist*, 1974, *11*, 87-95.

Wittrock, M. C., Marks, C. B., and Doctorow, M. Reading as a generative process. *Journal of Educational Psychology*, 1975, *67*, 484-489.

ASSESSMENT OF CONTENT TEXT DIFFICULTY BY ELEMENTARY AND MIDDLE SCHOOL PERSONNEL

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Actual observation of classroom activities indicates that most teachers depend upon a single text and ditto materials to provide printed material for their students (Durkin, 1979). In the elementary school, particularly, there is a reliance on the textbook to provide the basis for activities, questions and teaching techniques. The seeming reluctance of teachers to provide supplementary materials provided a direction for study.

In a recent survey, 56 elementary and middle school teachers were asked to list five reasons they believed more supplementary materials were not used in classrooms. The responses were tallied as to frequency of occurrence. The most frequent (n=54) response was an expected one, that of not enough time to search for and prepare material. Second (n=43) was a perceived lack of material available in the schools.

Third (n=40), teachers claimed they had difficulty judging supplementary material grade levels. If this survey is representative, then perhaps it is relevant to evaluate teachers' abilities to judge relative difficulty of textual material. In an earlier study by Palmatier and Strader (1979), secondary teachers were found to be generally unable to rank passages accurately according to reading difficulty. It was of interest to the authors whether or not this finding was true of elementary and middle school personnel as well.

One hundred seventy seven people attending a summer reading workshop at East Tennessee State University were presented the task of rank ordering five 100-word passages in each of the content areas of science, social studies, language arts and mathematics.

METHOD

Subjects

The sample comprised 177 people attending a 1981 summer reading workshop at East Tennessee State University. For the study, the subjects were considered as a total group and

separately by employment category, level of students taught, administrative task, number of reading/language arts classes taken, and classroom organization. The majority of those attending were classroom teachers in the elementary grades. Most of the administrators and supervisors attending were responsible for elementary and middle school levels. Eighty-seven percent of those attending had had at least three reading courses; 36 percent had taken the course Materials for Teaching Reading which contains a readability unit.

Procedures

Five 100-word passages were selected for each of the content areas of science, social studies, language arts and mathematics. The Spache Readability Formula (Spache, 1953), the Fry Graph (Fry, 1968), and the Dale Chall Readability Formula (Dale and Chall, 1948) were used to verify difficulty levels from third grade to eighth grade. Passages were from textbooks on the State of Tennessee Adopted Texts list.

Subjects were asked to rank order each set of passages according to reading difficulty for students. Sufficient time (20 minutes) was allotted so that all finished the task and completed the accompanying questionnaire describing categories of employment, etc.

The Statistical Package for the Social Sciences (SPSS, 1973) was used for computer analysis of the data. The parametric program portion provided frequency and percentage tabulation for each group and for the total sample on each of the twenty passages. Chi Square evaluations illustrated the associations between groups and accuracy of rankings.

Results

Several interesting results were found upon examination of the data. Generally, participants were able to rank social studies passages most accurately—percentages for five passages ranged from 38 percent to 50 percent correct. In mathematics the lowest percentage correct on a passage was 24 and the highest was 71. Science rankings ranged from 4 percent to 58 percent correct. Of particular interest, however, were the language arts rankings. Subjects were generally unable to rank those passages correctly; passage 1-7 percent, 2-7 percent, 3-7 percent, 4-35 percent, and 5-22 percent.

Chi Square values were computed in order to test the associations between the following categories and accuracy of rankings:

1. Employment category
2. Grade levels of students taught
3. Administrative tasks (if appropriate)
4. Number of reading/language arts courses taken
5. Classroom organization

Significant associations ($p < .05$) were found in seven out of twenty passges between accuracy in ranking and employment category. In only one instance was there a significant association between ranking and grade level of students taught. Five out of twenty associations were significant between administrative responsibility and ability to rank correctly. Number of reading and language arts courses taken was not significant to ranking, nor was the Materials for Reading course. Classroom organization was significant in seven out of twenty cases.

Classroom teachers were better able to rank passages than were those of other employment categories in the study. Their percentages correct were consistently higher than were those of administrators, supervisors and college students. Grade level taught was generally not a determinant of ability to correctly order passages. Elementary and middle school categories were analyzed combined and separately without significant results, and percentages correct were approximately equal.

Administrative and supervisory levels were studied with respect to subjects' abilities to rank passages. For the most part, those responsible for elementary and middle schools did better by percentage than did those responsible for system-wide or high school levels. Number of reading/language arts courses taken by subjects was not a determinant of ability to rank, although 32 of those in the study had had more than seven courses. Eighty-seven had completed three to five courses.

Type of classroom organization was significant in that those responsible for self-contained classrooms in all cases scored higher, by percentage, than did those responsible for departmentalized or special classes. Those in the study who had completed a materials for reading course did approximately as well as did those who had not had such a course.

DISCUSSION

While it is hazardous to generalize results to the entire population of school personnel, the authors believe that those examined are representative of school personnel in the region East Tennessee State University serves. Their training, years taught, and classroom organizations closely approximate regional data. In contrast to a study by Palmatier and Strader (1979) in which high school teachers were generally unable to rank passages, elementary and middle school teachers were able to do so with moderate success. It is interesting to note, however, that they were for the most part unable to rank language arts passages, despite many having had courses which carry readability components. It may well be that instruction in readability calculation does not carry over to the sort of "holistic" eyeball determination of relative difficulty involved in the study.

On the basis of these results, a component will be added to a control group of students in language arts block of courses. Instructors will attempt to teach students how to look for various things which raise readability levels. A follow-up study is planned to determine whether or not this training increases ability to judge relative difficulty of language arts material.

REFERENCES

Dale, E. and Chall, J. "A Formula for Predicting Readability: Instructions." *Educational Research Bulletin,* 27, February 1948, pp. 37-54.

Durkin, D. "What Classroom Observations Reveal About Reading Comprehension Instruction." *Reading Research Quarterly*. 1979, *4,* 481-533.

Fry, E. "A Readability Formula That Saves Time." *Journal of Reading,* 1968, *11,* 513-516; 575-578.

Palmatier, R. A., and Strader, S. G. "Teacher Performance in Assessment of Comparative Reading Difficulty of Content Materials." *Reading: Theory, Research and Practice,* Twenty-sixth Yearbook of the National Reading Conference, Milwaukee: National Reading Conference, 1979.

Spache, G. "A New Readability Formula for Primary-Grade Reading Materials." *Elementary School Journal,* 53, March 1953, pp. 410-413.

Statistical Package for the Social Sciences. Evanston, Illinois: Vogelback Computing, Northwestern University, 1973.

VOCABULARY INSTRUCTION IN MATHEMATICS: DO THE "LITTLE" WORDS COUNT?

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Many researchers have noted the importance of teaching students the vocabulary and concepts needed in the various content areas including mathematics. Taschow (1969) noted that Gray and Holmes found that even small amounts of direct and planned teaching of terms and concepts produced "dramatic" results in terms of comprehension and content field knowledge. John (1947) suggested that the meaning of mathematical terms such as "tangent" and "ratio" must be taught. Investigators such as Willmon (1971) and Kane, Byrne, and Hater (1974) have studied the vocabulary needed in mathematics. The emphasis of such investigators has been technical vocabulary.

Yet, as Dunlap and McKnight (1978) noted, there are three levels of mathematical vocabulary: the general, the technical, and the symbolic. The general and symbolic have been somewhat neglected. Perhaps it is assumed that knowledge of the general vocabulary will come from everyday experiences. However, Phillips (1979) noted that the correct interpretation of "little" words (from the general vocabulary class) is a major cause of difficulty in mathematics. Sullivan (1980) identified 50 words that comprised 51% of a sample of 44,394 words from selected K-6 grade mathematics texts. Most of these words represented "little" words from the general vocabulary class such as "the", "of", "to", "is", "a", "and", "in", and "at". But, does teaching students the meanings of "little" words from the class of general vocabulary enhance mathematics performance? The purpose of this study was to find out.

Procedures

Thirty-eight fourth, fifth, and sixth grade students attending a three week summer mathematics enrichment program served as subjects in this study. The students received mathematics instruction for two hours a day, each day of the three week period. Initially, all students were tested on mathematics computation using the *Metropolitan Achievement Test, Intermediate Level.* Based on their performance, students were assigned to one of four groups. Each group received daily instruction on mathematics computations and concepts for a period of one-half hour. Another half-hour was spent working individually on skills cards, another half-hour was spent on a fun math activity, and a fourth half-hour was spent on the control or experimental treatment. Students were assigned to the experimental or control group on the first day. Comparison of the pretest scores on the *Metropolitan* for the experimental and control groups indicated no significant difference ($t_{(36)} = .187$; NS). The pretest mean of the experimental group was 5.19 and the mean of the control group was 5.12. The control group received drill on basic addition, subtraction, multiplication, and division facts while the experimental group received instruction on the meanings of 50 vocabulary words. The words and their meanings are contained in Table 1. The meanings of the vocabulary words were discussed and recorded. Occasionally a game was played to reinforce the word meanings. Two informal tests were given to check students' retention of word meanings. The four groups rotated their activities so that during any half-hour no two groups were involved in the same activities.

On the last day of the program all students were posttested on mathematics computation. Pretest-posttest scores were compared for the entire group. Posttest scores for the experimental and control groups were also compared by means of a t-test. As suggested by Gay (1981) if groups are essentially the same on the pretest, posttest scores can be directly compared using a t-test.

Table 1

VOCABULARY WORDS AND THEIR MEANINGS

Word	Meaning
the	one specific thing
is	equals
a	any one thing
are	equals
can	able
on	on top of and under
page	one sheet in a book
who	question asking about someone
find	figure
one	idea in the head that stands for more than 0 and less than 2
ones	position; in a figure, the numeral to the far right
ten	idea in the head that stands for more than 9 and less than 11
tens	position; in a figure, the numeral to the left of the ones
hundred	idea in the head that stands for more than 99 and less than 101
hundreds	position; in a figure, the numeral to the left of the tens
and	something more, do both
or	either this or that but not both
number	idea in the head
numeral	sign or symbol used to stand for a number
how	question word asking for step or steps
many	amount, contrasted to few
how many	question asking for the number of something
what	question asking for things as opposed to persons
you	contrast to me, statement directed to you
your	contrast to mine, shows ownership
we	group including self, usually the subject of the sentence
it	contrast to he/she, in math refers to problem or thing
look	command to put eyes on and allow brain to react
write	put pencil in hand and make mark, symbol, etc. not write in cursive
each	every single one
numbers	ideas in the head
this	specific one in close location
that	contrast to this, specific but not in close location
set	group of things with something in common
us	group including self, usually the object of the sentence
there	contrast to here, not in close location
which	question that implies a choice
do	work or figure
same	alike, not different; equal in meaning
exercises	problems, not physical activities
these	contrast to those, more than one in close location
first	contrast to then, usually means spatial e.g. first in line; in math has to do with time e.g. do this first
have	contrast to have not or had, hold in one's possession
here	contrast to there, here is in close location
times	multiply; in "How many times" may mean the number of trials or performances
has	possession of, singular form
all	everything or everyone
equals	is, are, or the same amount on both sides

Results and Discussion

Comparison of pretest and posttest scores indicated that the students as a whole made significant gains ($t_{(37)}=5.72$; $p < .001$). The mean of the posttest was 6.6 months higher ($\overline{X} = 5.81$) than the mean of the pretest ($\overline{X} = 5.15$). When posttest scores for the experimental and control groups were compared no significant difference was found ($t_{(36)} = .87$; NS). However, the mean ($\overline{X} = 5.98$) of the experimental group was 3.6 months higher than the mean ($\overline{X} = 5.62$) of the control group. Although not significant, a difference od 3.6 months in three weeks time seems promising. Perhaps with additional time to ensure that the meanings of the words had been mastered, gains would have been significant. This possibility is being explored in a follow-up study.

It is interesting to note that drill on basic addition, subtraction, multiplication, and division facts which many teachers believe is necessary was no more effective than vocabulary instruction in improving mathematics computation.

When the reading specialist is asked by the mathematics teachers what can be done to help students read mathematics the discussion almost always turns to word problems and ways of helping students comprehend word problems. The results of this study would seem to indicate that helping mathematics teachers *teach* their students the meanings of the "little" general vocabulary words used in mathematics textbooks and suggested in the teacher's manuals for use in presenting lessons certainly would not be detrimental to mathematics achievement. Direct instruction supplemented by discussions and games could be used.

As noted, this study is being replicated over a longer period of time to allow sufficient time to insure mastery of the words. Preliminary results indicate the experimental group has made significant gains over the control group.

Although further study is needed on a variety of populations, it appears that reading specialists may assist math teachers with more than word problems. Teaching the students the meanings of the general vocabulary used in mathematics is at least as effective as drill on basic facts and may yet be shown to be more effective.

REFERENCES

Dunlap, W. P. & McKnight, M. B. Vocabulary translations for conceptualizing math word problems. *The Reading Teacher*, 1978, *32*, 183-189.

Gay, L. R. *Educational research: Competencies for analysis & application*. Columbus, Ohio: Charles E. Merrill Pub. Co., 1981, p. 229.

John, L. Clarifying and enriching meaning vocabularies in mathematics. In W. S. Gray (Ed.), *Improving reading in the content fields*. Supplementary Educational Monograph (No. 62). Chicago: The University of Chicago Press, 1947.

Kane, R., Bryne, M.A., & Hater, M.A. *Helping children read mathematics*. New York: American Book Co., 1974.

Phillips, J. The problem with math may be "reading". *Instructor*, 1979, *89*, 67-69.

Sullivan, K.M. *An analysis of the mathematical language of selected K-6 grade mathematics texts utilizing a communication theory of language*. Unpublished doctoral dissertation, University of Georgia, 1980.

Taschow, H. G. Reading improvement in mathematics. *Reading Improvement*, 1969, *6*, 62-67.

Willmon, B. Reading in the content areas: A "new math" terminology list for the primary grades. *Elementary English*, 1971, *48*, 463-471.

REACTION: VOCABULARY INSTRUCTION IN MATHEMATICS

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Some of the research of the past has sugested that a direct study of mathematics vocabulary alone can produce significant gain scores on mathematics tests. What perhaps is surprising to mathematics teachers about the Sullivan paper is that the identified vocabulary comprising more than one-half of the vocabulary used in mathematics texts from K-6 represented "little" words. What is even more surprising is that almost three-fifths of the words were not mathematical terms. Perhaps many mathematics teachers would have assumed that the proper place to begin vocabulary instruction would be with mathematics terminology. They might also have failed to realize that just because a child can pronounce a "little" word that does not necessarily mean that he knows the meaning of the word, especially in a mathematical context.

Even though no statistical significant differences were found between the control and experimental groups, the overall direction of the research seems promising. Perhaps as Sullivan suggests, more than a three week time period is needed (students were only given thirty minutes each day of the three weeks) to ensure that the students had mastered the meanings of the words.

The Sullivan study apparently was also limited in that the research was done during a three week summer mathematics enrichment program. Evidently all students in the study had to have two hours of mathematics instruction each day; therefore, having a typical "control" group was impossible. Both the experimental and control group of the study received three-fourths common treatment, and possibly this is what caused the 6.6 months gain on the *Metropolitan.* It is possible that neither the teaching of the meanings of the vocabulary words for the experimental group nor the drill on basic facts for the control group contributed to the gains on the test. What is needed then is a third group, one that gets the same three-fourths treatment that the two groups got in the study, but does not receive either the teaching of the vocabulary or the drill on the basic facts. It may be that scores for the group that receives vocabulary instruction and the group that receives drill on basic facts would not be significantly different, but both methods might be superior to scores that the third group would have. This information could be extremely useful to teachers. If this finding were the case, then one could legitimately conclude that instruction on vocabulary would be as effective as basic drill and that either process could improve mathematics scores. On the other hand, if there were no significant differences in the scores of the three groups, then neither teaching the vocabulary nor doing the drill would be recommended.

In spite of these criticisms, the research by Sullivan is encouraging. Results from her longer study now in progress should have even more valuable information for the mathematics and reading teacher.

FACTORS AFFECTING COMPREHENSION OF MATH WORD PROBLEMS—A REVIEW OF THE RESEARCH

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The research that focuses on students' comprehension of math word problems can be viewed from the math eduator's perspective, the reading educator's perspective, or from a

pedagogical perspective (Cohen, 1981).

The math educator's perspective suggests that to improve a student's comprehension of math word problems, the instructor must concentrate on the teaching of math concepts, procedures, generalizations, logical exchanges, and number facts. In order to read and work math problems successfully, one must understand the logical exchanges or moves (Davis, 1978) involved in solving the quantitative problems.

The reading educator's perspective would relate difficulty with word problems in math to linguistic and psycholinguistic comprehension theories. One such theory is Carver's (1977-78) rauding model which uses two variables that deal with written discourse and two that represent reader characteristics to predict comprehension performance. Pearson and Johnson (1978) would criticize Carver's model as too simple and would use more elaborae theories of comprehension to describe comprehension of word problems in math. "Whether the theory approaches the parsimony of Carver's or the complexity of Pearson's, these reading educators perceive comprehension as an interaction of text characteristics with reader characteristics" (Cohen, 1981, p. 177). The math educator's perspective puts most of the emphasis on the characteristics of the learner. This perspective tends to concentrate on strategies of instruction and the nature of problem solving, rather than focusing on written discourse and the subject's reading aptitude.

The pedagogical perspective would view the understanding of word problems in math in terms of a behavioristic approach such as that offered by Skinner (1969). This perspective would focus on the possibility of directly modifying behavior of math students rather than testing theories. This approach would begin with data in search of a theory. Both the math and reading educator's perspectives begin with a theory in search of data.

The author will attempt a review of the literature for factors affecting the reading of mathematics. This review will emanate from these three perspectives.

The Math Educator's Perspective

The perspective of the math educators places emphasis on the math aptitude of the learners. This view would suggest that students must possess certain understandings to succeed in mathematics. Piaget (1953) postulated that one such prerequisite for young subjects was conservation. He contended that a student does not acquire mathematical relationships through verbalizations, but only when his mental maturity is sufficient to grasp the principle of conservation of quantity. The student can then see that the number of items in a group remains the same regardless of how they are arranged. "Any adult attempt to impose mathematical concepts on a child prematurely results in verbal learning only" (Corle, 1972, p. 76).

Piaget also introduced the concept called reversibility. This prerequisite necessitates an understanding of the fact that regardless of how the quantity is manipulated, it can be restored to its original state by an inverse action (e.g., $7-4=3, 3+4=7$). Acording to Piaget, if a student lacks the capability to perceive such relationships, he cannot succeed in mathematics.

Brace and Nelson (1966) found a positive correlation between five- and six-year-old children's knowledge of cardinal number and their conservation abilities. This relationship decreased with age. Murray (1965) stated that the transition from nonconservation to conservation occurs sometime between the ages of seven and eight. "Any training procedures prior to this transition age appeared only to result in memorization of statements about the abstractions rather than to provide an awareness of the meanings of the relationships themselves" (Corle, 1972, p. 77). Almy (1966) investigated five- to eight-year-olds to determine the age at which students attained reversibility. Almy's study showed that the age of reversibility for most of the middle-class subjects was seven years and four months. Her study supported Piaget concerning the maturational development of a student's logical abilities.

So, once again the age-old question appears concerning the link between maturation and environment. Most researchers, however, are cognizant of the folly inherent in a determination to account for all the variance in math achievement by such simplicity. Intellectual development while certainly related to achievement in about anything, has always accounted for only a portion of the variance when the criterion was reading achievement, math achievement, or delivery of a paper at the American Reading Forum.

Hoel (1954) concluded from a study of math underachievers that emotional difficulty was responsible for most of the failure. Capps (1962) coneluded from a study of accelerated and retarded students in math that underachievement in math was related to personal adjustment. Examination of the mean intelligence quotient for retarded math groups indicated that these fourth and six grade subjects had average mental ability. Bruekner and Grossnickle (1953) specified the inter-correlations between intelligence and various math skills, with a low of .35 between I.Q. and math computation skills.

But what about the correlation between math computation skills and higher problem-solving ability? The math educator's perspective suggests that the correlation between math computation skills and the reading of math word problems should be positive and high. Balow (1964) studied 1400 sixth-grade subjects to determine the importance of reading ability and computational ability in solving math word problems. Balow discovered that general reading ability and computation ability had a significant effect on problem-solving ability. Scores on the math word problem test showed a closer relationship to computation ability than to reading ability.

Stern and Keislar (1967) investigated the utility of offering instruction in problem-solving strategy to third graders. Their study demonstrated that children who were taught strategies for solving math word problems were significantly more successful than children who had not been given such instruction. Cathcart and Liedtke (1969) studied the importance of selecting the proper solution process for a math word problem. Their findings indicated that reflective students who reflected upon the quality of their answers achieved better scores than the impulsive subjects who gave unconsidered responses.

The math educator's perspective with a focus on the learner and strategies for math instruction does have support in the research literature. Maturation and intelligence are related to math learning. The writer wishes to offer a syllogism. Organisms tend to learn what they are taught. Organisms that are taught strategies for accomplishing something are much more successful in applying those strategies than organisms that are not taught. Subjects are organisms. Subjects that are taught strategies for solving math word problems are more successful in applying these strategies than subjects who are not taught.

The Reading Educator's Perspective

It seems less than sagacious to suggest that numerical understanding alone will not guarantee success in mathematics, especially in math word problems.

Vanderline (1964) and Lyda and Duncan (1967) collected data which demonstrated that the direct study of math vocabulary alone produced a significant growth in elementary students' problem-solving abilities. Chase (1961) concluded that the ability to note details in math word problems was a skill necessary for success.

The textbook in many school systems is the only resource provided for instruction. Reys and Knowles (1968) surveyed elementary schools and found that two-thirds of the schools used only one textbook for math instruction. This dependence upon textbooks underscores the significance of the reading educator's perspective.

Repp (1960) counted 3,329 words taken from five third-

grade texts and found that approximately 1500 to 2000 were new to third graders. Reed (1965) found no significant agreement between the mathematics vocabulary of the textbook and the reading series used by her students. She found no significant agreement between the mathematics vocabulary of the textbook and standard word lists.

"There is considerable evidence that vocabulary specialists have discovered a disproportionate number of unfamiliar words in the mathematics books used by young children" (Corle, 1972, p. 86). Heddens and Smith (1964) used the Spache readability formula for grades one thru three, and the Dale-Chall formula for grades four thru six, to study five commercial math texts. These researchers concluded that all five series showed readability levels above the assigned grade levels.

Faison (1951) studied 38 texts from grades five thru eight and compared both the level of difficulty and the interest potential of the texts. He concluded that the math books were the hardest to read and ranked next to the lowest in interest. Faison's study was recently supported by an interesting piece of research by Elliott and Wiles (1980). They investigated the difficulty of current math textbooks by administering a cloze test from an eighth grade mathematics book to 91 certified mathematics teachers. Approximately 27% of the 91 teachers received scores of 55% or less correct.

Some studies have been conducted which dealt with both mathematical capabilities and reading skills. Chase (1960) studied 15 variables that might affect an intermediate subject's ability to solve math word problems and concluded that the ability to compute, skill in noting details in reading, and a knowledge of arithmetic concepts were the best three predictors of problem solving efficiency. Glennan and Callahan (1968) concluded that the most important factors were: general reading skills such as vocabulary knowledge, comprehension of the problem statement, and selection of relevant details; mechnical computation with a mathematical understanding of the concept of quantity, the number system, and arithmetic relationships; and a spatial factor involving the ability to visualize objects and symbols in more than one dimension.

While the math educators' perspective has support in the research literature, certain reading skills are also important for success in solving math word problems. Vocabulary development and literal interpretation of the problem seem crucial. Textbook readability is a major factor in relation to these skills.

The Pedagogical Perspective

The experiments in this section derive from the pedagogical perspective and recognizes the Skinnerian argument that theory building should start from data collected as a result of modifying human behavior.

An initial study that began the task of isolating format variables which interfere in math word problems was conducted by Loftus and Suppes (1972). They identified and defined eight such variables. Included was the order in which the math word problem was stated as compared to the order necessary to perform the appropriate computation. These researchers also listed the number of words in the problem as an important variable. Searle, Lorton, and Suppes (1974) used a step down regression model and identified how much each of 23 format variables contributed to the difficulty of math word problems.

Cohen (1981) continued with this research. He had students rewrite typical math textbook word problems to make them more understandable for other students having trouble with math. The purpose of the Cohen study was to discover the variables students perceived as difficult, and to compare these with the variables Searle et al. (1974) identified with the step down regression model.

Cohen chose 35 gifted sixth- and eighth-grade students with an I.Q. of 132 and above to rewrite 15 math word problems. One-half of the subjects had scored only average in math achievement as measured by grade level CTBS scores. The subjects rewrote 15 math word problems within a single class period in an attempt to make the problems easier to understand.

Cohen's content analysis of the students' rewritten items found 12 different format changes. He chose three of the variables in the format changes that concurred with variables reported by Searle et al. (1974) for further study as to their potency in solving word problems. Cohen chose variables that were amenable to student manipulation and for which it would be simple to construct instructional materials. The variables identified as interfering with math word problems were the absence of a diagram, the presence of extraneous information, and incorrect order of numbers in a word problem so that the presentation of the numbers appeared in an order other than that required for the appropriate solution.

Cohen then presented 225 average sixth graders with a 15 item test which included easy and difficult items in relation to the variables. The presence of diagrams in the math word problems, the reordering of the sequence in which numbers were presented in the problems to conform to the order required for appropriate solution, and the elmination of extraneous information all led to a significant increase in student performance in solving math word problems. The students were able to execute the arithmetic and logic of the word problems when presented in the easier formats, but encountered significant difficulty when attempting the more difficult formats. Computation was not a problem for these students. Format, however, affected comprehension.

Cohen conducted a third experiment (1981) to determine if subjects could be trained to insert a diagram when there was none, to extract extraneous information, and to reorder number sequence when it was inappropriate. The purpose of the third experiment by Cohen was to estimate how large the direct instruction effect would be after three class hours of instruction.

Seventy-one average sixth-grade students were placed in three treatment groups which received instruction in one treatment. The treatment groups used programmed materials which explained the task, demonstrated it, and then provided practice with immediate feedback. Each subject took a 21-item post test.

The findings demonstrated that when students were taught to insert diagrams in word problems that lend themselves to diagrams, they were significantly more successful than the control group. The instructional effect accounted for over 60% of the total variance. Instruction in extracting extraneous information accounted for over 65% of the total variance. Instruction in ordering numerical information accounted for 37% of the total variance.

Cohen's research is supported by Burns and Yonally (1964) who, using fourth and fifth graders, tried different ways of ordering the numerical information in math word problems. They found that subjects were less successful in getting correct answers when the numerical information was not in the order needed.

REFERENCES

Almy, Millie. *Young children's thinking.* New York: Teacher's College Press, 1966.

Balow, I. H. Reading and computation ability as determinants of problem solving. *Arithmetic Teacher,* 1964, *11,* 18-22.

Brace, A., & Nelson, L. D. The pre-school child's concept of number. *Arithmetic Teacher,* 1966, 12, 126-33.

Brueckner, Leo J., & Grossnickle, Foster E. *Making Arithmetic Meaningful.* Philadelphia: The John C. Winston Company, 1953.

Burns, P. C., & Yonally, J. L. Does the order of presentation of numerical data in multi-step arithmetic problems affect their difficulty? *School Science and Mathematics,* 1964, *64,* 267-70.

Capps, Lelon R. A comparison of superior achievers and underachievers in arithmetic. In Wayne Otto & Karl Koenke (Eds.), *Remedial teaching: research and comment.* Boston: Houghton Mifflin Company, 1969.

Carver, R. Toward a theory of reading comprehension and reading. *Reading Research Quarterly*, 1977-78, *13*, 8-63.

Catheart, W. G., & Liedtke, W. Reflectiveness/impulsiveness and mathematics achievement. Arithmetic Teacher, 1969, *16*, 563-67.

Chase, C. I. The position of certain variables in the prediction of problem solving. *Journal of Educational Research*, 1960, *54*, 9-14.

Chase, C. I. Formal analysis as a diagnostic technique in arithmetic. *Elementary School Journal*, 1961, *61*, 282-86.

Cohen, S. Alan, & Stover, Georgia. Effects of teaching sixth-grade students to modify format variables of math word problems. *Reading Research Quarterly*, 1981, *16*, (2), 175-200.

Corle, Clyde G. Reading in mathematics: A review of recent research. In James L. Laffey (Ed), *Reading in the content areas.* Newark, Delaware: International Reading Association, 1972.

David, E. J. Model for understanding understanding in mathematics. *Arithmetic Teacher*, 1978, *26*, 13-17.

Elliott, Peggy G., & Wiles, Clyde A. The print is part of the problem. *School Science and Mathematics*, 1980, *80*, 37-42.

Faison, E. W. J. Readability of children's textbooks. *Journal of Educational Psychology*, 1951, *42*, 43-51.

Glennon, V. J., & Callahan, L. G. *Elementary school mathematics; a guide to current research.* Washington: Association for Supervision and Curriculum Development, 1968.

Heddons, J. W., & Smith, K. J. The readability of elementary mathematics textbooks. *Arithmetic Teacher*, 1964, *11*, 466-468.

Hoel, Lesta. An experiment in clinical procedures for mathematics. *The 22nd Yearbook of National Council of Teachers of Mathematics*, 1954, 222-232.

Loftus, J., & Suppes, P. Structural variables that determine problem solving difficulty in computer assisted instruction. *Journal of Educational Psychology*, 1972, *63*, 539.

Lyda, W. J., & Duncan, F. M. Quantitative vocabulary and problem solving. *Arithmetic Teacher*, 1967, *14*, 289-291.

Murray, F. B. Conservation of illusion distorted lengths and areas by primary school children. *Journal of Educational Psychology*, 1965, *59*, 62-66.

Pearson, P. D., & Johnson, D. D. *Teaching reading comprehension.* New York: Holt, Rinehart, and Winston, 1978.

Piaget, J. How children form mathematical concepts. *Scientific American*, 1953, *189*, 74-79.

Reed, Mary K. S. *Vocabulary load of certain state-adopted mathematics textbooks, grades one through three.* Unpublished doctoral dissertation, University of Southern California, 1965.

Repp, Florence. The vocabulary of five recent third grade arithmetic textbooks. *Arithmetic Teacher*, 1960, *7*, 128-132.

Reys, R.E.., & Knowles, Lois. What is the status of elementary school textbooks? *Elementary School Journal*, 1968, *68*, 167-171.

Searle, B. W., Lorton, Jr., P., & Suppes, P. Structural variables affecting computer assisted instruction performance on arithmetic word problems of disadvantaged and deaf students. *Educational Studies in Mathematics*, 1974, *5*, 371-384.

Skinner, B. F. *The contingencies of reinforcement, A theoretical analysis.* New York: Appleton-Century-Crofts, 1969.

Stern, Carolyn, & Keislar, E. R. Acquisition of problem-solving strategies by young children and its relation to mental age. *American Educational Research*, 1967, *4*, 1-12.

Vanderline, L. F. Does the study of quantitative vocabulary improve problem solving? *Elementary School Journal*, 1964, *65*, 143-152.

REACTION: FACTORS AFFECTING COMPREHENSION OF MATH WORD PROBLEMS

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One of the areas that has caused much debate and discussion among mathematics educators is problem solving. In *An Agenda for Action,* the National Council of Teachers of Mathematics (1980) stated, "Problem solving must be the focus of school mathematics in the 1980s." Mathematics teachers who have had success in teaching many topics often are concerned that their students fail so miserably in problem solving. Often these teachers are at a loss as to what to do to increase problem solving skills of their students.

Cloer's preview of the research contains a wealth of information that should be of use to both mathematics teachers and reading educators. Reading the review, one realizes that there are many factors that possibly affect or relate to problem solving. One of the predictors of problem solving efficiency was that of selection of relevant details or extracting extraneous information. Often a student will simply look for the numbers and use all that appear. If a problem begins with "In 1982 . . .", some students will use those numbers in arriving at an answer. However, a recent study by Glynn (1981), indicated that word problems in today's mathematics books contain no extraneous data. Results of the study suggested that some entire mathematics books contain not *one* problem with extraneous data. So when students run across such information, they simply do not know what to do with it because they have not had the training. Teaching students how to pick out the important information and how to disregard extraneous information should then be of benefit to most students in real life mathematics problems. Also, teacher-made problems on tests may contain extraneous information.

Another factor mentioned by Cloer was that of dealing with unrealistic answers. One study suggested that the student who reflected on the quality of his answers got better scores than the student who did not. While many teachers argue that students should be taught estimating or arriving at logical answers, the student who has a reading problem will have a difficult time arriving at a realistic answer.

Much discussion involved the readability level of the textbook. Again if so many of the books are written above the grade level of the students, it is no wonder that they have trouble solving problems. While research has been cited about the readability level of textbooks, apparently little or no work has been done on the readability level of the problems the teachers give on tests.

If the three perspectives discussed by Cloer are related, it seems that reading comprehension is a common theme. If a child cannot read a problem, how can he be taught to extract extraneous information, arrive at logical answers, note details, reorder information, devise diagrams and do other things mentioned in the Cloer study? Without the reading skills, the student may just pick the numbers out of the problem and do some arithmetic operation with them.

It appears that the next needed work along the lines that Cloer has pursued is a meta-analytic study. Glass (1976) has defined a meta analysis as "the analysis of analyses" (p. 3). In other words, what is needed is a statistical analysis of all of the studies taken together to determine just what the best predictors of problem solving efficiency are. With problem solving receiving so much emphasis, a definite need exists for further research on the topic.

REFERENCES

Glass, G. V. Primary, secondary, and meta-analysis of research. *Educational Researcher*, 1976, *5*, 3-8.

Glynn, K. D. M. *Reading comprehension ability and the solution of arithmetic word problems.* Unpublished doctoral dissertation, University of Georgia, 1981.

National Council of Teachers of Mathematics. *An agenda for action: Recommendations for school mathematics of the 1980s.* Reston, Virginia: Author, 1980.

TEACHING MULTI-AGE LEVEL ELEMENTARY SCHOOL STUDENTS COMPREHENSION SKILLS THROUGH A SELF-DIRECTED SOCIAL STUDIES LEARNING PACKET

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The ability to comprehend is essential to student success in all curricular areas. Reading instruction is too important to be confined to one segment of the school day. Educators are realizing that while reading classes are vital for skill development, specific reading skills may not be transferring to other subject areas. Witty (1962) believes the teacher of every subject has a responsibility for helping the child to read the varied materials employed in instruction, for developing special vocabulary, building concepts, for cultivating critical reading and for fostering reading from varied sources. The use of reading skills is essential in the attainment of knowledge in the area of the social sciences. An analyses of the literature on the transfer of training reveals that transfer cannot be relied upon to achieve reading competence in content area subjects (Carney, 1977). Many teachers may recognize the value of content area reading instruction or be aware of its value, but teachers may not know how to incorporate it into their own classrooms. Some teachers have expressed concern about the frustration which students of lower reading ability exhibit when they cannot cope with the tasks of active learning. Perhaps some of this fear is that action-oriented practices make management and control more difficult. Grading students is often another problem inherent in an action-type program.

Reading is an activity that is distinguished by the content and purpose for what is being read. A concern is whether basic reading materials stimulate the type of reading that is required in the academic content areas. Studies by Stauffer (1966) and Willmon (1975) suggest that typical basal material provide a child with less than half the words necessary to comprehend the technical concepts in content materials. The writing patterns, the variance in vocabulary load and organizational structure, and the conceptual load differs greatly between reading materials and content materials. Johnson (1977) found that education in readability level appeared to have no impact on the conceptual difficulty.

Riley (1980) states that two important goals of teaching reading in the content areas are the acquisition of eontent area concepts and of the learner acquiring strategies which lead to tbe understanding of the concepts. The strategies utilized by the student will in most cases depend upon the techniques presented to the learner by the teacher.

Utilizing the process of curriculum development has ramification for the content area teacher. First, it is very important to diagnose where the students are in relation to the material: Do they know some of the concepts? Can they comprehend the vocabulary in the selections? Are they equipped with the necessary reading skills required in the level of materials which will be used?

The literature reflects, "For too long we teachers have labored under the naive assumption that if we assign ten pages for the next day, the student will know exactly what to do with them" (Duke and Powers, 1973). It is essential to remember that we are there to guide the students in their learning in the content area. The crucial factor is how we guide the student throught the material in the required subject, allowing "personal strengths, preferences, and discoveries to emerge" (Herber, 1970).

The keys to learning and retention in the content areas appear to be: an interest in learning on the part of the student; a schema into which new information may be assimilated; active involvement by the student in the search for meaning; a synthesis and reorganization of what is learned; and an application of what was learned.

The purpose of this paper is to present an alternate instructional technique to teaching comprehension skills to multi-age level children through self-directed social studies learning packets. The types of questions and activities required of the students contain statements at three levels of comprehension—literal, interpretative, and applied. Although a well-planned guide cannot solve all the problems of one class, it can provide many benefits for the students and teacher. The students in this sample are 9-11 years old and attend the University Laboratory School at Indiana University o Pennsylvania. Because the students in this school participate in many extra-curricular activities they are prevented from being consistently available for large group social studies instruction. Through a self-pacing module approach, students are provided an opportunity to gain practical experience through an integrated reading and study skills approach to social studies. The utilization of packets was conceived as a way to be of most benefit to the students and the teacher.

Tutolo (1977) believes one of the major values of a study guide is that it increases reading time, which enhances comprehension. It also provides the student with a structured approach to the material. McClain (1981) suggests that a study guide is a more flexible structure to assist the student in more efficient reading. A step-by-step procedure is given for studying the material to be learned. The idea of a study guide in this paper has been expanded into complete learning packets on the East, the South, and the Northwest and allows a felxible structure to assist the student in more efficient use of his learning and reading. In this type of approach the teacher works as a monitor, facilitator, and evaluator. The teacher must be well-organized, flexible, and possess good management skills.

The learning packets consist of questions and activities incorporating multi-media aids such as filmstrips, records, transparencies, library books, and social studies textbooks. The students are permitted to work alone or in a small group. If a student is a poor reader, he often elects to become part of a group in which there are good readers. The student is required periodically to meet individually or in small groups with the teacher to check his progress and for evaluation purposes. This innovative approach at the elementary school level is a means of developing independent research, organizational, and reading comprehension skills. (In addition to the use of packets, the students complete a map and globe skills unit and view related films in a large group followed by discussion.)

The approach described in this paper was used with 17 students in grade five and with 15 students in grade four during 1980-81 school year. The students were tested at the end of the year (1980-81) on the Comprehensive Tests of Basic Skills (CTBS).

Because of the small number of students in the laboratory school, one-third of those students in the 9-11 years age group (grades 4 and 5) were participants in the program using packets. The students were ranked using grade equivalent scores on the total reading and the social studies scores on the CTBS.

The results indicated that the majority of the students with a

high grade equivalent score in social studies were also the same students with a high grade equivalent in the total reading score. The results revealed a similar pattern for students in grades four and five. In essence those students who did well in reading comprehension were the same students who did well in social studies.

In conclusion, the use of a self-directed learning packet as a method for helping students become independent in their studying and application of skills and as a teaching technique to meet a scheduling situation proved to have value as an instructional technique. One value of the packet approach is that it teaches students how to learn. It sets a purpose for reading, allows students to relate to the material, and helps them to evaluate information. As with any new method, the students using this approach must fully understand the responsibilities placed upon them for their own learning. It cannot be concluded, however, that this approach alone contributed to the child's increase in comprehension ability. Further research using more sophisticated measures for evaluation and control needs to be conducted before the correlation between the packets approach and an increase in comprehension can be concluded.

REFERENCES

Carney, H. *Reading and academic content toward a theory of integration.* A paper delivered to the Reading Association of Ireland. USDHEW. (Eric Reproduction No. ED 162 251) 1977, 1-18.

Duke, C. and Powers, A. "Reading in the content area." *Clearing House,* 1973, 47, 221-226.

Herber, H. L. *Teaching reading in content areas.* Englewood Cliffs, N.J.: Prentice-Hall, 1970.

Johnson, R. E. "The reading level of elementary social studies textbooks is going down." *The Reading Teacher.* 1977, *30*, 901-906.

McClain, L. "Study guides: potential assets in content classrooms," *Journal of Reading.* 1981, *24*, 320-325.

Riley, J. D. Statement—based reading guides and quality of teacher response. *Journal of Reading.* 1980, *23*, 715-720.

Stauffer, R. A vocabulary study comparing reading, arithmetic, health, and science texts. *The Reading Teacher,* 1966, 20, 141-147.

Tutolo, D. "The study guide—types, purpose, and value." *Journal of Reading,* 1977, *20*, 503-507.

Willmon, B. Readability interference in reading mathematics texts. In B. Schulwitz (Ed.) *Teacher, tangibles, techniques.* Newark, Delaware: International Reading Association, 1975.

Witty, P. A. "Role of reading in the social studies," *Elementary English,* 1962, *39*, 562-569.

reading achievers will be high achievers in most curricular areas with the possible exception of mathematics. Why is this? Is it perhaps because we teach health, science, English, and social studies as though they were basal reading lessons?

The area of American education which is the most highly criticized by our neighbors overseas is our over-reliance on textbooks. We have reached the point where publishing houses determine the content of the curriculum and teachers follow guides and manuals, dispensing information, like robots on an assembly line. Social studies, science, and health are areas of the curriculum where teachers can generate student enthusiasm, excitement, and even love of learning, if only they would stop treating these areas as though they were reading lessons. Teach social studies in such a fashion that children are being trained in the skills of the social scientist and they will come to realize the relevance of reading as it applies to the content area.

Elliott has taken a group of 15 fourth-grade and 17 fifth-grade children and presented social studies through an independent study and small group learning mode. Capitalizing upon the idea of developing a study guide to direct independent study activities, Elliott expands the concept by developing learning packets consisting ". . . of questions and activities incorporating multi-media aids such as filmstrips, records, transparencies, library books, and social studies textbooks." This idea is what Veatch (1959), (1969) and Barbe (1961) called for during the '60s when writing about individualized reading instruction. Elliott concluded that the 32 fourth- and fifth-grade children maintained a consistent high or low relationship between reading and social studies achievement scores on the Comprehensive Tests of Basic Skills (CTBS). She cautions that further research is needed before generalizing that the results will be consistent time after time.

In times of competency based testing and competency based promotion standards it is refreshing to read that someone is attempting to teach children through creative, highly stimulating activities.

REFERENCES

Barbe, W. B. *Educator's guide to personalized reading instruction.* Englewood Cliffs: Prentice-Hall, Inc., 1961.

Veatch, J. *Individualizing your reading program.* New York: G. P. Putnam's Sons, 1959.

Veatch, J. *Reading in the elementary school.* New York: Ronald, 1969.

REACTION: TEACHING MULTI-AGE ELEMENTARY SCHOOL STUDENTS COMPREHENSION SKILLS

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It has been stated in beginning reading methods courses and in the literature that reading is taught in all areas of the curriculum. Teachers have the responsibility to insure that the necessary reading skills; word recognition (unique vocabulary) and comprehesion skills are presented in each curricular area. Joan Elliott has concluded that high achievers in reading comprehension are high achievers in social studies regardless of the approach used to teach the subject. For Elliott, this is justification to use independent learning packets in social studies. She found that reading comprehension and social studies gains remain high or low depending upon the individual student's ability.

Principals and teachers have said many times that high

GLOSSING FOR IMPROVED COMPREHENSION: PROGRESS AND PROSPECT

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As Otto reported at last year's (1980) meeting of the American Reading Forum, a growing number of people have been working with a technique that involves the systematic use of marginal notes and other extra-text notations to direct readers' attention while they read. The terms "gloss" and "glossing" are being used to designate and describe the technique. As we have said many times, neither the idea nor the term "gloss" is new. Both have been around at least since medieval times, when theologicans used gloss to elucidate scriptures. We are attempting to refine the technique by moving toward "systematic" glossing procedures that can be used with confidence, both formally in preparing instructional materials, and informally, in face-to-face teaching in the classroom.

Instead of relying on traditional adjunct aids like questions

and advance organizers, we want to be able to direct readers' active attention to places in text where the application of specific skills or strategies would be appropriate, to instances where a particular strategy could be useful for extracting meaning, and to key words and ideas. In other words, we are trying to share mature readers' perceptions of and insights into the reading process with developing readers.

In two papers presented at last year's meeting, Otto described gloss as a two-faceted process that seeks to enhance a reader's ability to deal with both process and content related matters in seeking to understand printed material. He also pointed out the need to choose specific skills and strategies for development through glossing. In another presentation in the present session, Richgels and Hansen offer guidelines for designing gloss notations and examples of gloss notations for a wide variety of content area text selections.

While the existing papers suggest answers to many questions related to the development of gloss notations, many questions remain. Some of these questions address basic issues related to the day-to-day use of the glossing technique in classrooms. In the remainder of this paper we pose what we believe are some critical questions and suggest some tentative answers.

Question #1: **Are certain types of reading material more suited for gloss notation than others?**

Content Area Reading Material

Most of our thinking and effort so far has been directed toward developing gloss for content area text. However, certain realities related to content area reading present problems as well as opportunities for the teacher attempting to use gloss notation. For example, the reading abilities of students in any given content classroom will always vary a great deal. Some students will have extensive reading ability while others may lack even basic reading skills. Likewise, the background knowledge and experiences of students will vary considerably. These and other individual differences in students are factors which content area teachers must cope with daily; but these differences come into focus and demand explicit attention when one prepares gloss notations.

While facts such as these set hurdles for teachers who attempt to use gloss, they also serve to underscore the prospects that gloss offers to teachers. Gloss notation may serve as an aid to direct students to areas of text and to levels of understanding that make optimal use of their current—and sometimes limited—reading ability. By directing individual student's attention through gloss notations in text we think that there is prospect of enhancing the understanding and reading ability of the less able student and, at the same time, of challenging the more capable one.

Developmental Reading Materials

In addition to content area text, the material used in a reading class may offer prospects for gloss activities. One purpose for using gloss is to encourage development and application of specific comprehension skills and the "general strategies" that efficient readers use in understanding text. With this purpose in mind, it seems appropriate to use reading materials which are designed to teach reading skills and strategies. Using reading materials in which content knowledge acquisition is relatively less important may allow the teacher preparing gloss to concentrate more on process and not feel that subject matter content is being neglected.

It seems safe to hypothesize that students who are just acquiring reading skills and strategies could benefit from gloss notations which give insight into the appropriate application of the skills and strategies in the reading material they encounter. For example, the brief summaries of stories, purpose setting questions, directions regarding specific use of comprehension skills in the text, and other similar information normally contained in basal teacher manuals could be rewritten at an appropriate reading level and placed in student books to enhance not only their understanding of the reading skills and strategies that they have been taught but also the content of the material.

Reading skills and strategies that are carefully taught and reinforced with gloss activities in a reading class will not however, automatically transfer to content area texts. As students move into the upper grades, they are faced with materials that have a more distinctive expository writing style, content specific vocabulary, and a host of new concepts. However, the introduction to gloss activities along with the introduction of reading comprehension skills and strategies in the reading class has prospects of shortening the tremendous step that now exists between "learning to read" and "reading to learn."

Material Supplemental to Basic Text

Gloss notations could also be used effectively with the supplemental materials which students are expected to read.

In a content classroom, supplemental materials could be glossed to demonstrate and guide students in the development and application of appropriate reading skills and strategies to be used in reading the text for the class. A teacher might develop lessons using gloss notations on transparencies, handouts and other supplemental reading materials to be used with the class. Students could receive instruction, through the use of the glossed supplemental material, on appropriate ways to read their subject area text.

In a reading class where gloss notations are provided for narrative sytle reading material, the problems associated with transferring reading skills might be lessened if expository style supplemental material were also provided. Elementary level weekly newspapers could serve as supplemental reading material to be used with gloss notations. Teachers could also prepare supplemental reading material written in expository style, like content material, yet at a reading level adapted to their students' ability.

In summary, the question of what type of text is best suited for gloss activities appears to be a matter of individual choice. Each of the above types of reading materials pose certain limitations and present certain problems for the teacher who prepares gloss. However, each of the above reading materials used with gloss notations appear to offer prospects for helping students to better comprehend what they are asked to read.

Question #2: **At what point in reading instruction should gloss activities be introduced?**

The answer to question one will go a long way toward providing insight for answering this question. We will briefly discuss three possible times to introduce gloss activities to students. We believe that gloss has prospects for enhancing children's understanding of text at any of these times.

An introduction to gloss activities could accompany the instruction of beginning reading comprehension skills and strategies. An examination of basal reading programs will reveal that comprehension skill instruction begins early in the first grade. Appropriate types of gloss notations could serve as a means to help young readers better understand the value of certain reading comprehension skills and strategies. Gloss used at this stage in children's reading development would have objectives more directly related to process than content. The use of gloss activities in the initial stages of reading instruction would be subject to an important condition: That the skills and strategies that are introduced have practical value for beginning readers and that this value be clearly demonstrated. We think that gloss can serve as an effective means to demonstrate the importance of reading skills and strategies to the beginning reader.

Another time to introduce gloss is when students are required to make the transition from learning reading skills in a reading class, to applying them to content-area materials. We feel certain that gloss has great promise for helping students both develop and apply effective reading behaviors in understanding expository text.

Finally, the teacher might introduce gloss to the students who display comprehension difficulties in reading. Such a use of gloss as a remedial strategy might occur when students are using either content-area material or developmental reading material. Gloss used at this time, and in this manner, would be designed to help individual students make the transition from acquiring reading skills to applying them when they read.

Question #3: **What is the optimal amount of gloss notation for enhancing the understanding of the text?**

It has been suggested that gloss notations be prepared for two purposes: (1) to enhance readers' understanding of the specific content at hand, and (2) to shape the development and encourage the application of readers' skills and strategies related to the process of reading. How much gloss is needed to accomplish this? The answer to this question may only be found through carefully planned research studies. The question goes beyond the concern that attention must be given to the amount of time available to read gloss notation and perform accompanying activities. The question relates to the common sense notion that at some point the amount of gloss notation in a text will become an important factor in whether students understand what they are asked to read. Too much gloss may interfere with students understanding, while too little gloss is likely to have no effect at all on their understanding.

It remains to be determined whether the answer to this question will be derived from subjective judgments on the part of teachers using gloss, or from well defined guidelines developed by careful research.

Question #4: **Should the stages of gloss (demonstration, development, internalization and fading) have both vertical and horizontal aspects?**

Otto and associates have envisioned four stages for gloss notations: (1) *demonstration,* where the intent is to create readers' awareness of approaches to text that help them comprehend and develop their enthusiasm for working with glossed materials; (2) *development,* where readers are given explanations of how to use skills and strategies, and opportunities to apply them in reading content-area texts; (3) *internalization,* where readers move toward a level of metacognition, including awareness of (a) when to apply the skills and strategies they have learned, and (b) which of them is most appropriate in a given situation; and (4) *fading* where readers are simply reminded to think about their own efforts to understand what they are reading, to think about the skills and strategies that help them to comprehend, and to correct miscues and misconceptions. Exactly how students will or should progress through these stages has not been determined. To the present, however, we have been inclined to think of the strategies as "process related": Students move systematically from one stage to the next as they become more familiar with the skills and strategies of the reading process.

However, it may be that the stages would better be thought of as "materials related". Students would progress through each stage acquiring skills and strategies in material of a certain type and difficulty. They would then, to a certain extent, need to repeat the stages as they encounter new text material at a higher difficulty level.

In other words, the stages may be primarily reader/text dependent. The stages may depend upon students' abilities and experiences relevant to understanding a certain text. Thus, a student might be at the *development* stage with one type of text which requires certain skills and strategies and at the *internalization* stage with other text materials requiring different skills and strategies.

Question #5: **What should be the goal of gloss notation?**

The primary goal of glossing is to help students not only to *acquire* but also to *internalize* and *apply* the skills and strategies that enable them to be independent readers of the full range of material they encounter. To subscribe fully to this goal one must envision a reader who reads, with complete comprehension, everything possible. However, comprehension is an on-going, never ending process, which is pervasive to all reading and to verbal discourse. There can be no precise starting or stopping point from which to judge a reader's "complete" understanding.

Perhaps the ultimate goal of glossing should include an additional aspect: To develop readers who are aware of the factors which contribute to, or interfere with, their understanding of the full range of material they encounter. Such a dual goal would identify glossing both (a) as a way to strengthen students' reading comprehension skills and strategies, and also (b) as a means to provide students with metacognitive knowledge and insights assumed to underlie the ability to control one's own mental activities.

GUIDELINES FOR WRITING GLOSS NOTATIONS WITH A FOCUS ON COMPREHENSION SKILLS AND STRATEGIES

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Otto (1980) described a technique for improving the understanding of expository text, which he termed "gloss". Gloss employs marginal notations to direct readers' attention to places in text where the application of specific behaviors would be appropriate. The development of gloss has been motivated by a confidence that comprehension skills can be taught and a concern that students need help making the transition from *learning* skills to *applying* them when they read content-area materials.

Gloss notations are written on pages separate from the text and keyed to the text by numbered brackets. These brackets appear on the left edge of the gloss page and—when the gloss page is placed to the right of the text page—they set off sections of text to which the gloss notations refer (see Figure 1).

Figure 2 depicts gloss as the product of a dual-focused process that operates within certain constraints and considerations and provides possible instructional excursions. The figure is explained in detail elsewhere (Otto, White, Camperell, 1980). Very briefly we are suggesting that (a) the behaviors to be directed by gloss notations may include strategies as well as skills; (b) the gloss may focus on the *content* of the text as well as comprehension *processes;* (c) students may need preparatory or additional instruction (excursions) in comprehension skills and strategies or in content-area subject matter; and (d) the form gloss takes depends upon such constraints and considerations as expected results, elements of the instructional milieu and characteristics of both the reader and the text.

This paper identifies skills and strategies which we have selected as the foci for the process gloss notations we have prepared, and describes guidelines for others who would prepare such notations.

Skills

Reading with understanding involves an interaction between reader and text. In order for the interaction to be productive,

the reader must bring certain capabilities to the reading task. In *learning-to-read* situations students usually receive some type of skill instruction, and in many instances they are required to demonstrate competency with reading-learning skills on criterion-referenced tests and/or norm-referenced tests. In *learning-from-text* situations, however, merely "having" a skill in one's repertoire is not sufficient; the successful reader must be able to make appropriate application of the skills in a variety of contexts. We have found that skills usually are not applied spontaneously. "Application" must be demonstrated and nurtured in content-area classrooms as students use reading skills to learn from text.

Reading skills should be practiced and applied, in whatever combination is appropriate for a given task, with the expectation that they will help the reader deal with the main task of getting meaning from the text. In developing specifications for glossing content-area texts, then, one basic step has been to identify a list of skills that we feel are important to reading content-area texts. We selected a list of skills that seem to be both teachable and useful for learning from text. The skills can be clustered as follows:

1. Skills for getting the meaning from words
   a. determining word meaning from word parts
   b. determining word meaning from context clues
2. Skills for getting the meaning from sentences
   a. paraphrasing (synthesizing)
   b. attending to details (analyzing)
3. Skills for getting the meaning from selections
   a. determining the central thought of a passage
   b. identifying relationships and conclusions
4. Skills for identifying sequence.

Strategies

Specific skills, we believe, are a legitimate focus of instruction to enhance students' understanding of content-area materials. But we acknowledge the need for a broader focus. Consideration of emerging research and theory (Otto and White, in press), interviews of students (Camperell, 1980; White & Camperell, 1980), and surveys of teachers (Morrison, 1980) provide us with a basis for giving attention to more general strategies as well as specific skills.

Of the general strategies we have identified, we have selected four that are frequently described by successful readers and that appear to have high utility in reading most content-area texts. These strategies are: establishing a *purpose* for reading, relating what is being read to *prior knowledge*, attending to text *organization* and/or imposing organization on both new information and prior knowledge, and *monitoring* one's own comprehension. A brief rationale for choosing each of these strategies follows.

Establishing Purpose. About three-fourths of the respondents to Morrison's (1980) survey of post-elementary teachers thought that the following "skills"—which together amount to a purpose-setting strategy—were important to reading their subject matter:

1. The student sets a purpose for reading.
2. The student formulates questions relevant to his/her purpose for reading.
3. The student adjusts reading speed to his/her purpose for reading.

In addition, about half of the respondents thought that they would need to help students learn how to apply these "skills." Interviews with students indicate that students, as well as teachers, recognize a need to read for a specific purpose (White & Camperell, 1980).

From a more theoretical-empirical stance, Rothkopf (in press) claims that establishing purposes for reading (or "learning goals," as he calls them) controls the mathemagenic process of selection (i.e., differentiation of processing of a text which results in differences in what is learned from that text). Appropriate control of the selective mechanisms is, according to Rothkopf, necessary for learning.

Establishing a purpose may either be initiated by the teacher or be self-imposed by the student. According to Robinson (1978), the only strategy that is as effective in improving study-reading as having the teacher establish purposes for reading is having students identify their own purposes. Robinson goes on to suggest that once a purpose is set, a reader can initiate other strategies for comprehending that are consistent with the purpose. This is in line with the aspects of the productive purpose-setting strategy identified by Morrison: (a) once a purpose has been set by the students or the teacher, (b) the students are in a position to develop questions relevant to their purpose, and (c) then the students can determine and adjust their reading speed in view of the purpose.

Establishing a purpose is an important strategy that must be developed systematically. A well-defined purpose goes beyond simply "gaining understanding" to identifying specific goals and reasons for reading. One way to help students develop their purpose-setting strategy is to provide gloss activities which deal specifically with the three related aspects identified in the Morrison study.

Prior Knowledge. Recent studies related to schema theory provide a rationale for developing a strategy for *relating prior kowledge to what is being read.* Taken together, the studies make a basic point: what is known affects one's understanding of new material. Results of interview studies conducted by Camperell (1980) and White and Camperell (1980) suggest that students seek to use their prior knowledge to gain understanding in at least three ways: (1) by *relating* the new information in a passage to ideas they have read in preceding passages, (2) by *contrasting* the information they are reading to their prior knowledge and experience, and (c) by *comparing* the information they are reading to their prior knowledge and experience (Camperell, 1980, p. 107).

Smirnov (1973) also suggests that "using" prior knowledge is an important strategy: He talks directly about relating the content of the text to existing knowledge: ". . . the greater the knowledge with which the new is correlated, the more it is connected with it, and the more recognized are their connections, the deeper is comprehension" (p. 143). The subjects of his interviews said they engage in the following actions when they try to understand text:

1. composing a plan
2. correlating the text with existing knowledge
3. correlating the content of various parts of the text
4. utilizing images
5. translating the content of the text into "one's own language" (p. 148).

Based on Camperell's and White's interviews and Smirnov's work, then, we feel it is important to consider two processes—correlating text content with existing knowledge and correlating content of various parts of the text—in preparing gloss to help students develop the strategy of using prior knowledge. In other words, gloss notations that are intended to develop the strategy of actually using prior knowledge, should help students learn how to relate what they are reading to (a) what they already know or to familiar experiences and (b) information they have just read in a previous paragraph or passage of the same text.

Organization. At least 75% of the respondents to Morrison's (1980) survey indicated that students need to develop the "skill" of attending to the organization of material in order to learn content-area subject matter. In addition to *attending,* however, students must actively organize new information as they read; that is, they must organize what they are reading in relation to what they already know. Students must develop strategies for making use of the organization provided in texts.

Herber (1978) suggests that students need to be aware of both the internal organizational patterns of textbooks—such as cause/effect, comparison/contrast, time order, and simple listing patterns (p. 78)—and the external organization of a text, which involves format (e.g., formulas and problems characteristic of math texts or the typographical style characteristic of poetry

or drama texts) and physical features (e.g., graphic aids, tables of contents, and chapter headings). Kintsch (in press) identified six types of expository text organization: identification, definition, classification, illustration, comparison and contrast, and analysis (structural analysis, functional analysis, causal analysis).

If a text does not provide a consistent easy-to-follow organization, students may have to impose organization on the information in order to comprehend. Schallert (in press) speaks of "the human propensity to impose organization upon input." And Smirnov (1973) found in his interviews that one process used by his subjects is the composition of a plan which involves breaking up the material into parts, grouping thoughts, and isolating meaningful points.

To develop an overall strategy of attending to organization, gloss notations could help students recognize and make use of (a) different text formats and external features of text, such as headings and subheadings, that are used in organizing information, and (b) types of text organizations or "text types." After reviewing Herber's organizational patterns and Kintsch's text types, and after studying a variety of expository texts, we identified six types of organizational schemes that we believe may be important in helping students comprehend content-area material: cause-effect, comparison/coatrast, sequential order, simple listing, definition, and classification. Gloss notations that are intended to help students develop the strategy of attending to organizational cues and imposing organization on information could make use of such schemes.

Comprehension Monitoring. All of the strategies we have discussed so far—establishing a purpose, relating prior knowledge, and both *attending to* and *imposing* organization—are synthesized when the strategy of comprehension monitoring is applied. Comprehension monitoring is a "metacognitive" activity, which, according to Baker and Brown (in press), "entails keeping track of the success with which one's comprehension is proceeding, ensuring that the process continues smoothly, and taking remedial action if necessary." *Active* comprehension monitoring must, however, involve "acting upon" such metacognitive experiences in order to improve comprehension. "Acting upon," according to Yussen, *et al.* (in press) and Winograd and Johnston (1980), amounts to selecting reading strategies that will be most effective in fulfilling the needs of the particular reading situation. "A good comprehension monitor will select whatever strategy is most appropriate to the situation at hand" (Baker and Brown, in press). To monitor comprehension successfully, then, students must not only recognize when they are having problems with understanding, but also (a) be familiar with a variety of strategies, such as the ones discussed above, that can be applied to overcome comprehension problems; (b) be able to select strategies that are appropriate to a particular situation; and (c) know how to apply the strategies to overcome the specific problem.

It follows from these requirements that the comprehension monitoring strategy stands in a special relation to each of the three other strategies we have described. Gloss notations written to develop the ability to monitor comprehension would focus on the interdependence among comprehension monitoring per se and the other strategies we have identified. The monitoring strategy is related to setting a purpose in that—as Winograd and Johnston (1980) have pointed out—assessment or control of the subject's purpose for reading is a prerequisite to making generalizations about a reader's ability to detect errors. In order to have criteria for judging their success in comprehending, students must set a purpose for reading. On the basis of (a) the established purpose and (b) their ability to answer the questions they have formulated in line with the purpose (see the discussion of establishing a purpose for reading), students should be in a position to evaluate the adequacy of their comprehension. Gloss notations would, first, help students develop the ability to establish purposes and goals as outlined earlier. Next, gloss notations would help students (1) become *aware of* the *need to* evaluate their comprehension in terms of the purpose they set, and (2) learn techniques for evaluating their comprehension in line with the purpose.

Prior experience in performing a particular task and prior knowledge about specific content are also important to successful comprehension monitoring. The purpose of related gloss notations would be to bring about an awareness of the importance of prior experience in evaluating comprehension.

Organization of knowledge, according to Markman, improves comprehension monitoring. Relevant gloss notations could be designed to develop the strategies of attending to the organization of text and of imposing organization on the information presented in text. As Markman (1981) suggests, students should be given "ample opportunity" to work with clearly organized material.

Guidelines for Glossing

Preparing gloss is a process of making selections. If gloss is to enhance readers' understanding of a given text, then choices must be made as the gloss notations are prepared. The choices include such matters as deciding what aspects of the text's subject matter are most important, what components of the complex process of comprehending the subject matter require emphasis, and what purposes are to be served by this particular reading. We have tentatively identified five guidelines for making the basic choices. The guidelines are consistent with the constraints and considerations (expectations, the reader, the text, and the milieu) depicted in Figure 2, and they pertain to preparation of gloss for any text. (NOTE: For convenience we refer to "the person who prepares gloss" as "the glosser.")

1. *Decide what specific skills and strategies are important.* This broad guideline calls for the most critical choice to be made in preparing gloss. (Of course a crucial *prior* decision—to be made by the teacher or, if someone else prepares the gloss, the glosser or, preferably, the glosser in collaboration with the teacher—has to do with the expected outcomes related to the particular reading assignment. Without such a decision, there can be no next steps. All of these guidelines, then, pertain to the preparation of gloss notations once a decision regarding expected outcomes has been made.) We presented a tentative list of skills and strategies earlier in this paper. We think that they are important and that they are ones used by mature readers. The point here is that anyone who expects to write process-related gloss notations must have a specific list of skills and/or strategies in mind, whether it be ours or somebody else's.

2. *Consider the reader's status with regard to the skills and strategies identified in Guideline 1.* The glosser must be guided by the reader's process-related knowledge. In a given text-reader interaction, the reader presumably will have been introduced to the critical skills or strategies, either through classroom instruction or a process-related excursion. His/her degree of mastery of those skills or strategies will determine the focus and nature of the gloss-directed instruction, e.g., the level of explanation and amount of practice to be provided through gloss notations.

3. *Consider the prior knowledge of content required.* The glosser must be guided by the reader's content-related knowledge. The reader's previous exposure to and mastery of information relevant to the subject area of the text-in-hand must guide choices about the focus and nature of gloss in the same way that facts about his/her process knowledge do. Differing levels of expertise about subject matter—obtained from personal experience, previous classroom instruction, or a content-related excursion—help determine the appropriate level of gloss-directed instruction.

4. *Identify the skills and strategies demands of the text.* Both formal (e.g., the text analyses of Kintsch, 1974, 1979, in press, and Meyer, 1975) and informal (e.g., mapping and outlining

techniques) analyses of the text can yield information that is relevant to the preparation of gloss. This information must be used together with information related to Guidelines 1, 2, and 3. The glosser may be guided, for example, by a variety of text-related questions about organization, such as whether the text is well or poorly organized; whether the reader is skilled in recognizing good or poor organization and knows how to benefit from good, or, overcome poor, organization; and whether the teacher's objectives for the student include his/her mastery of strategies for dealing with text organization.

5. *Be sensitive to the physical and personal realities of the reader and of the classroom.* The glosser must be guided by practical knowledge of what will work in a given milieu. Among the factors that are relevant to this consideration are the amount of time available to read gloss notations and perform accompanying activities; the nature of grouping arrangements, which acknowledges, in practice, that gloss notations are often written—and the choices prescribed above are made—with "readers" rather than "the reader" in mind; the student's willingness to work with glossed materials; and the technology that is available for producing glossed materials.

Glossing is not a new procedure—as Otto (1980) has pointed out, it dates at least to medieval times, when theologians glossed scripture. We have described guidelines for using this old procedure in new ways: to improve readers' understanding of expository texts by developing and encouraging application of comprehension skills and strategies. We have selected skills and strategies that we believe are important to understanding the text and which seem to be the ones applied by the mature reader.

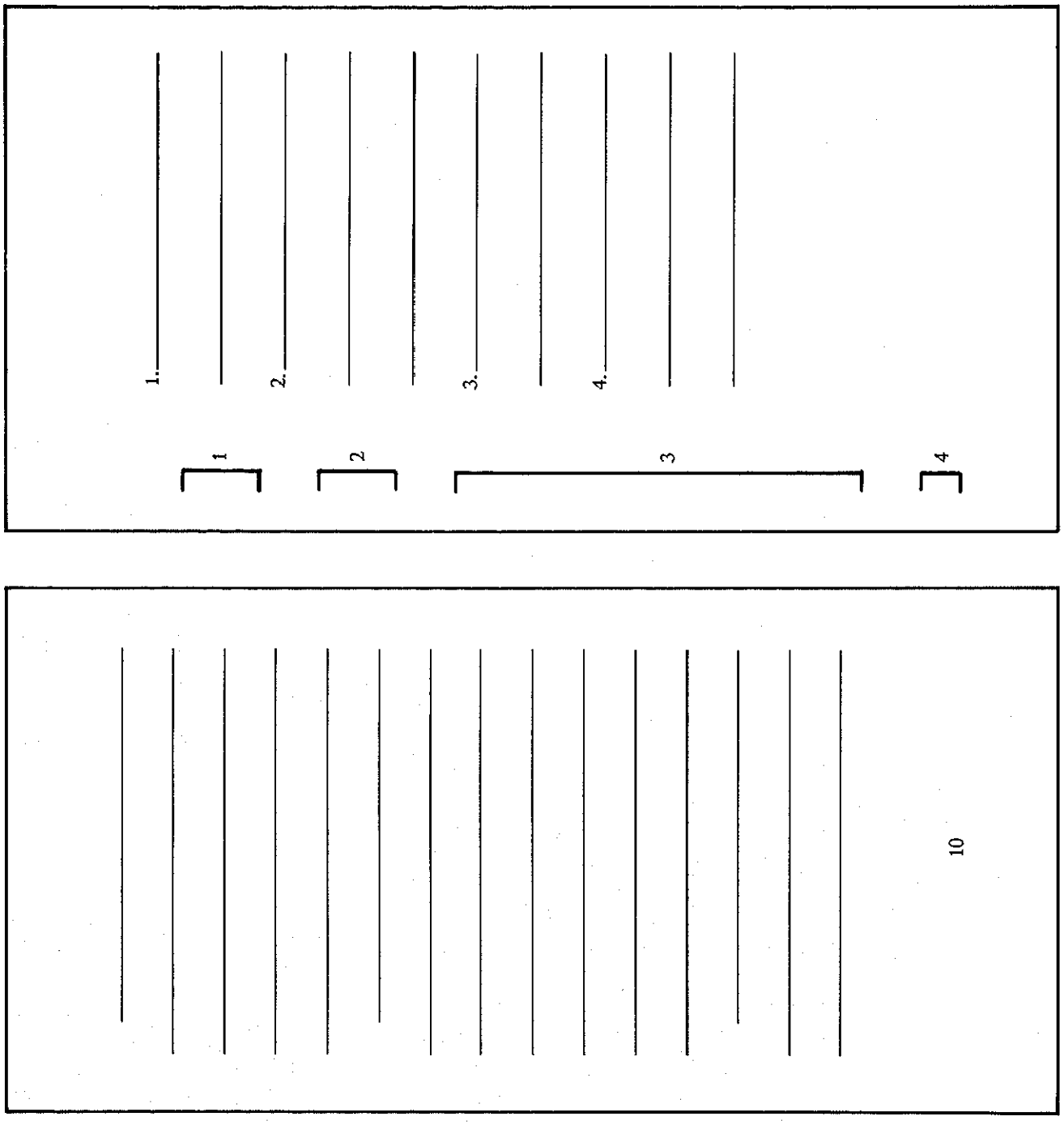

Figure 1. Text page and accompanying gloss page.

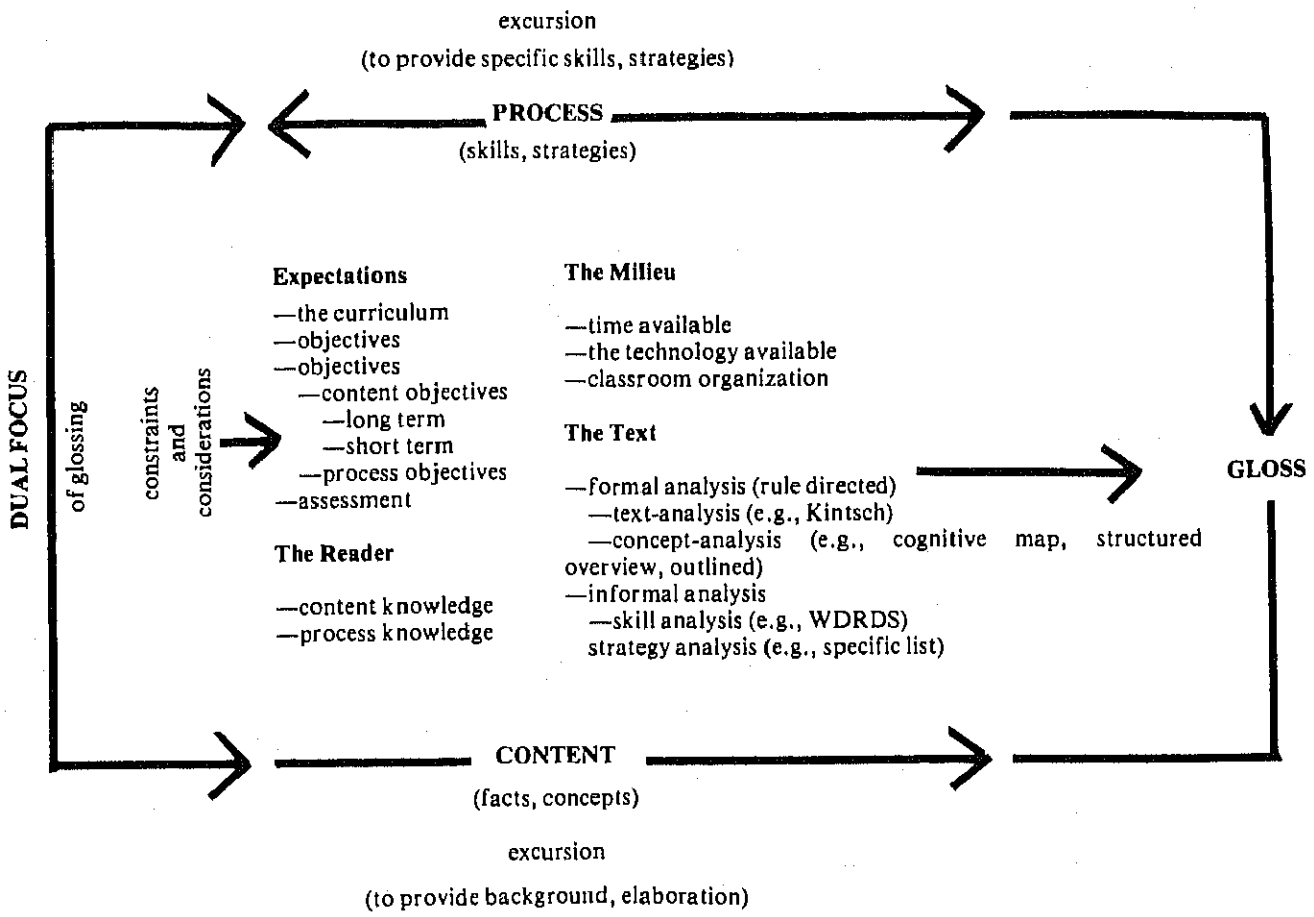

Figure 2. Foci, constraints and considerations for glossing.

REFERENCES

Baker, L., & Brown, A. L. Metacognitive skills of reading. In D. Pearson (Ed.), *Handbook of reading research.* New York: Longman, in press.

Camperell, K. *Identification of seventh-grade students' insights about the strategies they used to study and understand an expository text* (Technical Report No. 566). Madison: Wisconsin Research and Development Center for Individualized Schooling, 1980.

Herber, H. L. *Teaching reading in content areas.* Englewood Cliffs, N.J.: Prentice-Hall, 1978.

Kintsch, W. *The representation of meaning in memory.* Hillsdale, N.J.: Lawrence Erlbaum Associates, 1974.

Kintsch, W. On modeling comprehension. *Educational Psychologist,* 1979, *14,* 3-14.

Kintsch, W. Text representations. In W. Otto & S. White (Eds.), *Reading expository material.* New York: Academic Press, in press.

Markman, E. M. Comprehension monitoring. In W. P. Dickson (Ed.), *Children's oral communication skills.* New York: Academic Press, 1981.

Meyer, B. J. F. Identification of the structure of prose and its implications for the study of reading and memory. *Journal of Reading Behavior,* 1975, *7,* 7-47.

Morrison, B. *The identification of reading skills essential for learning in seven content areas at postelementary levels* (Technical Report No. 528). Madison: Wisconsin Research and Development Center for Individualized Schooling, 1980.

Otto, W. Some suggestions for helping students understand content-area texts. *First Annual Yearbook of the American Reading Forum,* 1980.

Otto, W., & White, S. (Eds.), *Reading expository material.* New York: Academic Press, in press.

Otto, W., White, S., & Camperell, K. *Text comprehension research to classroom application: A progress report* (Theoretical Paper No. 87). Madison: Wisconsin Research and Development Center for Individualized Schooling, 1980.

Robinson, H. A. *Teaching reading and study strategies: The content areas.* Boston: Allyn and Bacon, 1978.

Rothkopf, E.Z. Adjunct aids, and the control of mathemagenic activities. In W. Otto & S. White (Eds.), *Reading expository material.* New York: Academic Press, in press.

Schallert, D. L. The significance of knowledge: A synthesis of research related to schema theory. In W. Otto & S. White (Eds.), *Reading expository material.* New York: Academic Press, in press.

Smirnov, A. A. *Problems of the psychology of memory.* New York: Plenum Press, 1973.

White, S., & Camperell, K. *Investigations into students' understanding of the reading process and their perceptions of their ability to read content material* (Working Paper No. 302). Madison: Wisconsin Research and Development Center for Individualized Schooling, 1980.

Winograd, P., & Johnston, P. *Comprehension monitoring and the error detecting paradigm* (Technical Report No. 153). Champaign, Ill.: Center for the Study of Reading, 1980.

Yussen, S. R., & Mathews, S. R., & Hiebert, E. Metacognitive aspects of reading. In W. Otto & S. White (Eds.), *Reading expository material.* New York: Academic Press, in press.

GLOSSING CONTENT-AREA TEXTS: A VEHICLE FOR INSERVICE TRAINING

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Even though reading educators have for years encouraged, directed, and insisted that reading instruction ought to be part of every content area course, surveys conducted by reading educators such as Early (1973) and Hill (1975) indicate that there are few successful school-wide programs where the emphasis is on the content-area course and the reading specialist serves as a consultant. Many postelementary reading specialists appear to spend their time teaching developmental or corrective courses, working with individual or small groups of poor readers, administrating reading labs, testing programs or sustained silent reading activities. (Witte and Otto, 1981).

Many individuals who begin working in schools as reading teachers have hopes of becoming reading specialists but few seem to accomplish this in any other form than that of obtaining state certification. Any many who start out as reading specialist resort to finding groups of students to teach. The dream every reading specialist has of being sought out by teachers for advice and being invited to assist in course planning and teaching seems to be just that—a dream.

I don't mean to sound pessimistic or to be negative about the role of the reading specialist. I just want to reflect to you some of the things I see, think, and feel after spending two years as a reading specialist in a public school system.

True, teachers do attend reading in-service sessions when mandated by the administration and they do enroll in university level courses when mandated by departments of public instruction. Yet this instruction seems to have made little impact on teachers' perceptions of the reading specialist as a resource person or on what it means to incorporate reading into a content area course. I'm frankly confused about the kind of impact these inservices and courses have had. In attempts to start conversations, teachers have said to me such things as: "I took a reading course once and now I can read a thousand words per minute." or "I always encourage my students to use SQ3R." or "I want to get a new text. Which readability formula should I use?"—On second thought, maybe the reading courses teachers have taken have had a clear impact. And the resulting perceptions have been that reading specialists are concerned with reading rate, readability formulas, and a few well-publicized study techniques. Teachers do not see the reading specialist as someone who can help them convey a complex content through the use of printed materials. Teachers appear to view the specialist as someone who can only help them with short-term tasks such as selecting textbooks or teaching specific study techniques not as a resource person who could be involved with them in the process of creating instructional materials and planning ways of helping students develop the habit of learning through reading. The insights that reading educators have gained in recent years in the areas of text analysis, the reading process, and study behaviors have yet to be conveyed to teachers even though many of these ideas represent a meaningful way of dealing with texts that are often too difficult for students to understand and too boring to sustain a natural interest.

In his opening address to the first session of the American Reading Forum Otto (1981), talked about the gap between research and application. He pointed out that most reading educators either choose to align themselves with researchers or with practitioners and that virtually no one makes a commitment to translating research into practice. Then he tentatively and cautiously suggested that marginal gloss might be a vehicle for applying some of the findings and insights gained from research. As a practitioner and teacher, I'm not sure I know what researchers mean when they talk about translating research into practice. In other words, what would researchers expect to see if someone said to them, "I have translated research into practice." I'm not even sure that the results of research always need to be translated. Maybe they only need to be communicated. But speaking as a practitioner and based on admittedly limited work with small groups of teachers, I believe that marginal gloss does indeed provide a way of translating or communicating the results of research to teachers. The gloss technique is, of course, similar to the Directed Reading Activity and other types of reading guides, yet, because of the way gloss has been conceptualized and developed, it seems to be a technique that easily incorporates theory, specific research findings, and accepted instructional

practices.

Otto (1981) mentioned three categories of studies that he felt could make a contribution to reading education. They were related to the reader, the text, and the interaction of the reader with the text. I would like to give a few examples of how I have seen some teachers respond to the knowledge gained from these studies when it was presented to them in the context of learning how to write marginal glosses.

The Reader

Writers such as Anderson (1978), Rumelhart and Ortony (1977), and Rumelhart and Norman (1978) have attempted to explain how the prior knowledge of readers affects what they understand and remember. They discuss theories designed to explain how new information can be added to existing knowledge structures without causing change and how new information may result in a returning or restructuring of ideas and learned concepts.

Teachers seemed responsive and interested when these ideas were presented to them. Certainly, the idea of reviewing what is already known before attempting to learn new information and the idea that new information causes change make sense and are concepts that most teachers have used in one form or another. But hearing about the work of researchers seemed to clarify what teachers already knew and to convince them that these concepts are important and should be incorporated into their teaching. And some of the gloss activities written by teachers seemed to reflect an understanding of the concept of prior knowledge. A biology teacher for example wrote, "You think that your heart is one the left side. Right? Wrong! Read the information in 24 and then explain why so many people make this mistake. (Austad, 1981). Several social studies teachers began their gloss activities by instructing students to make a list of important ideas they had or facts they already knew about a particular historical topic. A fourth grade teacher incorporated the prior knowledge concept into her instruction in another way. After she had finished reading *Charlotte's Web* to her class she decide to have the students "do research" or find more information about pigs. But first they listed what they already knew. Following the reading of books, pamphlets, and encylopedia entries they found that they had to go back to their original list and change several items such as "Pig means someone who eats too much." Apparently they found that left to their own devices pigs are no more inclined to over-eat than any other creature.

The Text

Kintsch and Vipond (1977) begin their paper "Reading comprehension and readability in educational practice," by lamenting the schism between psychology and education. They point out that for the most part psychologists are not interested in the educational implications of their theories and educational researchers are in general disillusioned by psychological theories that are too crude to be useful. The problem accordng to Kintsch and Vipond is that educational research instead of being based in psychology has become empirical and atheoretical. They suggest that educational researchers have done many studies and gathered much data on topics that have little depth or relevance to how human being process information. Kintsch and Vipond then present their model of text comprehension and the implications this model has for the educational problem of readability. Readily acknowledging that their model in an unfinished state, they suggest only that it might provide some insight into an important applied problem, that of matching the reader with printed material written at an appropriate level.

When I worked with teachers to help them learn to write marginal glosses, the first step in the process was to in some way analyze their selected texts. The model proposed by Kintsch and Vipond and their discussion of the inadequacies of commonly used readability formulas provided a meaningful starting point.

Teachers are familar with readability formulas and they also realize that somehow these formulas are supposed to assist them to select texts that will match their students' reading abilities. Though most will say that they base their final text selection on other factors such as the focus of the content, the emphasis given certain topics, the equality and type of illustrations, or their own ability to read and understand the text. Teachers also indicate that they are confused by readability formulas. Reading experts say they are supposed to identify the difficulty level of a text but how they do this is not that logical or clear. Science and math teachers who are comfortable with numbers and familiar with how constants like those used in readability formulas are derived seem particularly skeptical. But they were interested in discussions which focused on the idea that readability formulas based on word and sentence length give no indication of the difficulty and the number of concepts presented or of the clarity of the presentation itself. Readability formulas only give a prediction that some typical student at a specific grade level ought to be able to read the passage and answer an unspecified type and number of comprehension questions correctly. And sometimes readability formulas are not even good predictors. It's not difficult to find materials with low readability levels that include very complex concepts. A technical report entitled "The construction and use of a propositional text base" by Turner and Greene begins with a discussion of propositions as abstract word concepts. Beyond a doubt, this discussion would be unintelligeble to anyone without an extensive background in propositional analysis. Yet the Fry readability rating for this passage is ninth grade.

But the fact that readability formulas are not always good predictors is not the real issue. The problem is that approaches to analyzing text which are based on empirical evidence rather than carefully thought out ideas encourage teachers to accept simplistic answers instead of becoming actively involved in understanding the text from the viewpoint of a student who knows little or nothing about the subject matter.

Without going into a detailed discussion of Kintsch's system of analyzing text in the form of propositions and arguments, it is possible to explain to teachers that the question they ought to have in mind as they evaluate their tests is: "How well do the words or the surface structure of the language used by the author explain or reflect the concepts the author is trying to convey?". A number of idea presented by Kintsch and Vipond seem to provide a basis teachers can use to analyze text from this perspective.

Kintsch and Vipond offer a detailed discussion of characteristics that contribute to textual difficulty and use a complex terminology. But essentially what they seem to be saying is that readers need more time to comprehend text that presents many concepts, new concepts, and concepts without interconnections thus requiring the reader to make inferences. They also explain that more time is needed if the reader is required to go back and reread and if the reader is prompted to reorganize previously read information as a result of ideas that appear later.

As a result of a discussion of these ideas, one teacher said something to the effect that the nature of written communication is such that some ideas must be stated first and others must follow even though it would be ideal to somehow demonstrate or explain the complete concept all at once. Rereading and eorganizing are necessary in order to understand many types of written materials. The problem seems to be that students who learned to read through the use of a typical basal program where most of the material is presented in a predictable narrative style, do not seem accustomed to using these strategies.

Following an analysis in which teachers attempted to identify

sections of text where many and new concepts were introduced and where rereading and reorganizing appeared to be required, teachers wrote gloss activites designed to assist students. In a section of a biology text where many ideas were introduced the teacher wrote a gloss activity which directed students to construct a brief outline so that the ideas could be organized and remembered. At points where the text seemed to lack apparent connections or to require inferences, some teachers wrote activities in which students were asked to paraphrase or write summaries. When the text indirectly defined a term through context, one teacher indicated that the definition was in fact indirect thus eliminating the need to make a type of inference. Many teachers made use of gloss activities to direct students to go back to a section of text and reread or to note a concept that would be important when the next section in the text was read.

This approach to analyzing text and subsequently writing gloss activities was certainly not systemitized. Yet it seemed to be credible when another reader, myself, read the text and the glosses. Teachers seemed to have glossed those portions of text that were in fact difficult, i.e. that required rereading, reorganizing and a very conscious effort to remember.

The Interaction of the Reader With the Text

In a comprehensive review of the research on study strategies Anderson and Armbuster (1980) suggested that one study technique or approach is not necessarily better than another. They indicate that the important factor is the involvement of the student or reader in the process of understanding and remembering. Again teachers seemed to accept this idea for its common sense value and to realize that gloss activities could be written which would encourage students to become actively involved.

At first, teachers balked at the idea of drawing brackets on their activity sheets to direct students to the portion of text referred to in the activity. They wanted to just write the activities without bothering with all the lines. But after using the bracketed aetivities they seemed to be convinced that students were more deliberate about responding to the gloss activities than when they answered questions that appeared at the end of a typical chapter in a textbook. Someone also said that students appeared to be reassured by the brackets. Instead of saying that they couldn't find an answer, they read and reread the material within the bracketed space. In general, teachers perceptions of students' reactions to gloss activities were similar to my own after I had worked with students as they responded to marginal gloss. Students do perform the tasks required. They do become involved with the text. Often they say that the work is difficult but they also eonvey a sense of satisfaction once they have completed it.

Writing marginal glosses and discussing the researeh ideas and insights that can be associated with them appears to be one way of working with teachers and their texts in a public school setting. The gloss concept is comprehensive enough to include many approaehes and ideas related to effective reading and studying and teachers seem to accept it for what it is—a credible technique that requires much work and effort on the part of both teachers and students. Perhaps gloss and other similar techniques can be used by reading specialists as they attempt to develop meaningful content area reading programs.

REFERENCES

ANDERSON, R. C. Schema-directed process in language comprehension. In A. Lesgold, S. Pellegrino, S. Fokkema, & R. Glaser (Eds.) *Cognitive psychology and instruction.* New York: Plenum Press. 1978.

Anderson, T. H. & Armbruster, B. B. *Reading and text—studying strategies.* Paper presented at a conference on Reading Expository Text, The University of Wisconsin-Madison, Wis. November, 1980.

Austad, M. Marginal gloss activities for ninth grade biology. Informal teacher prepared instructional materials. Middleton-Cross Plains Area School District, Middleton, Wisconsin, 1981.

Early, M. J. Taking stock: secondary school reading in the 70's *Journal of Reading,* 1973, 16, 364-373.

Hill, W. R. Secondary reading activity in western New York: A survey *Journal of Reading,* 1975, 18, 13-19.

Kintsch, W. & Vipond, D. Reading comprehension and readability in educational practice and psychological theory. In L. G. Nilsson (Ed.), *Memory: Process and problems.* Hillsdale, N.J.: Lawrence Erlbaum Associates, 1978.

Otto, W. Toward understanding comprehension. In G. H. McNinch (Ed.) *Comprehension: process and product. First yearbook of the American Reading Forum.* Hattiesburg, Mississippi: University of Southern Mississippi Press, 1981.

Rumelhart, D. E. & Norman, D. A. Accretion, tuning, and restructuring: Three modes of learning. In J. W. Cotton & R. L. Klatzky (Eds.), *Semantic factors in cognition.* Hillsdale, N.J.: Lawrence Erlbaum Associates, 1978.

Rumelhart, D. E. & Ortony, A. The representation of knowledge in memory. In R. Anderson, R. Spiro, & W. E. Montague (Eds.), *Schooling and the acquisition of knowledge.* Hillsdale, N.J.: Lawrence Erlbaum Associates, 1977.

Turner, A. & Greene, E. The construction of a propositional text base. Technical Report, University of Colorado, April, 1977.

Witte, P. L. & Otto, W. Reading instruction at the postelementary level: review and comments. *The Journal of Educational Research.* 1981, 74, 3, 148-158.

GLOSS IN ACTION: GLOSS USED IN REMEDIAL READING CLASSES TO IMPROVE COMPREHENSION OF EXPOSITORY TEXT

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Students at a residential treatment center for neglected and delinquent adolescent boys were having problems reading expository text. As the reading instructor, it became my responsibility to identify and employ strategies that would improve their comprehension. One of the strategies that was used was marginal gloss (Otto et al, 1980).

Marginal gloss was used to improve comprehension of text that was written two or more grade levels above a student's reading ability and contained content in which a student did not have substantial background knowledge. Marginal gloss consists of carefully designed activities that are used for the dual purpose of guiding the reader in processing the text-specific content and providing the reader with practice in reading to strengthen his reading skill. Activities are placed on worksheets. In the left hand margin of each sheet brackets are drawn so that when a worksheet is aligned with a page in text the brackets direct the reader to the exact lines where the reader can find the content to complete the activities. Marginal gloss seems to offer maximum cuing for the student inviting the reader to interact with the text, rather than interact with the teacher to acquire meaning.

To illustrate how gloss was used at the treatment center, three situations will be presented: (1) Using gloss with a severely reading disabled student; (2) Adapting gloss for efficient use with content-area texts; and, (3) Using gloss to facilitate use of a single-level text with students of varying reading abilities.

A severely reading-disabled student

Bill was twelve years old and had very little schooling. By throwing severe tantrums upon arrival at school, he learned from young how to be sent home. As he got older, his tantrums

became more severe and vandalism and assault accompanied his outbursts. The school system could no longer tolerate his behavior and he was sent to the treatment center.

At the center Bill was enrolled in the remedial reading program. Testing showed that he was at a primer level. He was very nervous about learning how to read. In his initial sessions in reading class, he would hit his fists on the walls, writhe his hands, and pace the floor. Extensive work with Bill, using texts written with a gradual progression of difficulty, improved both his reading proficiency and his self-confidence. The next step was to move Bill from simple narrative text to expository text.

This transition to expository text was very timely. Plans were being made to send Bill to a neighboring public school. At the school he would have to be able to work with expository writing in contnt-area textbooks. Bill had virtually no background knowledge in the content areas. So a dual goal was establisbed of not only developing the process for reading content-area textbooks, but also developing a knowledge base in content-area subjects. To achieve the goal the text *Regions and Social Needs* by Laidlaw was selected. This text is generally used as a third grade social studies text. The topic chosen for the first unit was desert life. After deciding on the text and the unit, I glossed the text.

A spiral notebook was used in which questions were placed on the back of each sheet in the tablet. The questions focused on the major concepts that were developed in the unit. Brackets were added to the left-hand margin of each sheet so that when the sheet was aligned with the appropriate page in the text, the brackets would point to the lines of text where the content could be found to answer each question. In a typical session, Bill would be assigned several pages to read in a section. After reading the text, he would then use the gloss to help him process the major concepts such as characteristics of desert plant and animal life, and how people live in different deserts.

Gloss was used to help Bill gain the information. Another step in the process was to help him maintain the information. Reading plans (Dana, 1980) were used at the end of each section in the unit to help him remember what he had learned. A reading plan is a skeletal diagram of the text made up of headings to represent the major concepts. Lines and arrows connect the headings to show the relationships of the concepts within the text. Space is provided with each heading so that the reader can fill in the facts that develop the major concepts. Using the facts from the marginal gloss activities, Bill would fill in a reading plan. He would then have a summary sheet of the major concepts to use as a study aide to help strengthen his retention of the content.

In a year and a half, Bill's reading score went from a primer level to a 3.8 grade level. He was enrolled in a public school and succeeded. He was eventually sent home and now attends school on a regular basis.

Efficient use of gloss

The second situation in which gloss was used at the treatment center was to assist students who could not read several pages of a content-area textbook and answer simple literal questions on the content. But, unlike Bill, these students did not exhibit as much anxiety nor were they as reading disabled.

Developing a marginal gloss tablet for each student would have been impossible. So I modified the technique. Many content-area textbooks contain question boxes interspersed throughout the text. These questions are used to determine if the student has understood the main concepts covered in the text. I located several textbooks with question boxes directly in the text. Next, using strips of tagboard six inches long and two inches wide, marginal-gloss strips were constructed. At the top of the first strip of tagboard, I wrote the page numbers the student was to read before answering the questions. After reading the pages, the student would come to a question box in the text. The marginal-gloss strips had a question number, page number, and brackets for each question. To make sure that the brackets would point to the right area in the text where the student could find the answer to a question, lettered slashed-lines were included on each strip and in the text. By matching the same lettered slashed-lines in the text with those on the marginal gloss strips, the two would be properly aligned and the student wold know where to find the answer to a particular question. The student would then write the answer to the question in a notebook.

The number of marginal-gloss strips would vary depending on how many questions were in a question box. The strips had a hole punched in the top and were held together with a metal ring so that each strip could be flipped over when it was completed. When the student was finished with all the questions in a question box, he would get his next set of marginal gloss strips.

For most of the students after working with several sets of strips in one textbook a "fading" process began, and student dependency on the strips began to diminish. They were able to recall the information needed to answer a question or could recall the place in text where the information could be found without having to rely on the strips as a guide.

This technique was both efficient and effective. Marginal-gloss strips could be prepared quickly because of the question boxes already in the text. Use of the strips seemed to help the students understand and remember the content.

Single-level text

The third situation in which marginal gloss was used at the center was to assist students as they read the drivers' education manual. Students who were going to public schools to take drivers' education were all failing. Several of them approached me for help. The major problem in developing a program for them was having to use a single-level text for students with reading abilities that ranged from third-grade level to eleventh-grade level. Since my schedule could not accommodate private tutoring sessions for all the students, marginal gloss offered a possible solution.

I spent a year developing, testing, and refining the gloss for the drivers' manual. Student involvement helped to improve the materials. For each chapter in the manual there was a separate packet of gloss. Reading plans were also designed for use with the manual to strengthen retention of the content.

In the second year, the drivers' education program was opened to all the students. Twelve students enrolled in the first course. For each chapter the lower level students worked with a packet of marginal gloss, used the packet to fill in a reading plan which was referred to as an open-book test, studied the plan, and took a closed-book test that was designed following the format of the Department of Motor Vehicles' test. Higher level students simply read a chapter, filled in the reading plan, studied the plan, and took the closed-book test. If any student desired, he could take his materials to his room and work on them in the evenings. After a student completed all the marginal gloss packets he was given a cumulative test and a final grade for the course.

I observed an interesting effect taking place while the students worked with gloss. Once they became accustomed to the process of locating information and became more familiar with the content, an automatic "fading" from the need of the brackets in the gloss took place. By the end of the second chapter most of the students no longer needed the marginal-gloss brackets unless the activity was very difficult. Several students were even able to advance from using marginal gloss in the first two chapters to simply using reading plans for the final chapters.

The effectiveness of the drivers' education program seemed positive. Out of the twelve students taking the first course,

nine completed the program.

Marginal gloss is a strategy that was used successfully in several situations to help students having difficulties reading expository text. The effectiveness of the strategy is particularly noteworthy because of the nature of the students. Most of the students had not been successful in school and were easily frustrated. They required instruction that resulted in success. Marginal gloss afforded them success in reading. There is a need to further explore the merits and limitations of this strategy.

REFERENCES

Dana, C. The effects of using a graphic advance organizer before, during, and after reading on the comprehension of written text (Technical Report No. 545). Madison Wisconsin Research and Development Center for Individualized Schooling, 1980.

Otto, W., White, S., & Camperell, K. Text comprehension research to classroom application: A progress report (Theoretical paper No. 87). Madison Wisconsin Research and Development Center for Individualized Schooling, 1980.

"IMPROVING READING IN THE DISCIPLINES—DIRECTIONS FOR DEVELOPING AND REFINING AN INSTRUCTIONAL TECHNIQUE": A REACTION

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As reported by Brown, Campione, and Day (1981), there are three types of instructional procedures which have been used to aid student learning. Students can be taught to use a strategy without understanding the reason for the strategy, they can be taught a strategy and informed how the strategy can help them learn, or they can learn how to evaluate and monitor personal performance as they use a strategy. The goal of this third approach, self control training, is to help students learn to learn. It is intended that students will transfer self-learning tasks to various materials without further teacher intervention.

Otto and his colleagues have developed a multifaceted and comprehensive approach to the use of glossing for the purpose of developing independent learners. Their studies have attempted to systematize a set of procedures for teachers and a set of skills and strategies for students. They have developed glossing techniques which accomodate the interaction among the variables of curriculum, teachers, students, and texts.

Rather than attending only to the students' skills, or self-learning strategies, or amount of comprehension gain, Otto and his associates have attended to all three factors. Glossing, or the use of "marginal notes and other extratext notations," is used to direct the students' attention to specific concepts by demonstrating to the student how s/he can use appropriate strategies and skills to interpret these concepts.

Otto and his colleagues suggest a sound and logical progression of stages for glossing notations: (a) demonstration, (b) development, (c) internalization, and (d) fading. Active involvement by the reader in the process of comprehending the text is built into each stage of glossing. Skills and strategies are taught (even some skills, excursions, are taught in isolation) and then applied directly to the text. Students are shown how to use the skills and strategies when they are asked to define, paraphrase, explain and react to the ideas presented in the materials.

Another value of their approach to glossing is the selection of a representative set of skills and strategies which are taught to the students. Rather than presenting a long list of isolated skills, the four general skill areas interrelate several others so that they can be used in a comprehensive manner. Similarily the four strategies are those that are comprehensive, interrelated and have "high utility" for processing the material.

As Otto and Hayes illustrated, glossing techniques can be applied to a variety of materials. Glossing is appropriate to explain abstract concepts and ideas in content materials (e.g., social studies texts which explain the War of 1812 in two paragraphs or math texts which contain complicated word problems). As Singer and Donlan (1980) indicated, the notations provide a "semantic bridge" between the new information and the students' prior knowledge (p. 332). Also glossing would seem to be appropriate for basal materials, supplementary materials, and skill practice manuals—perhaps even teachers manuals and textbooks. Even though the nature of glossing might vary according to the materials, students' familiarity with the techniques presented in varying materials might heighten the use and application of these skills and strategies.

As indicated in their presentation, the comprehensiveness of this approach requires intensive preparation for both students and teachers. Students need to be taught how to use the skills and strategies at each stage of the glossing procedure. As the notations change with different materials according to the variance in structure and/or concept load, students need to learn to adjust their expectations and use of gloss.

Teachers need to be taught how to prepare gloss notations and monitor their students progress. Neither of these tasks seems to be easy. As Witte indicated, the reading teacher/consultant can communicate ideas of research about the reader, the text, and their interaction as a way of helping teachers understand and develop glossing techniques for their own curriculum needs. To be successful with gloss, teachers need encouragement and a solid knowledge base. They need to be able to identify the goals of their curriculum, assess the knowledge and skill level of their students, and analyze the concepts and structure of the text. Systematic teacher preparation is critical to the success of this technique as is teacher commitment to the project of glossing the text. Witte's description of the process she used to involve the teachers with whom she worked seemed to be an excellent method for teacher inservice. Systematic training can also be developed through teacher education programs in colleges and continuous inservice school programs.

Even with the provision of precise instruction for teachers, some of the teaching tasks remain quite weighty. Assessing prior knowledge and analyzing text structure can be complicated. So far, methods to analyze text structure have produced procedures which are time consuming and probably unrealistic for the classroom and/or content teacher.

As Hayes and Otto indicated, several major questions are yet to be answered. It is not known what the "optimal amount of gloss notation for enhancing" comprehension will be. Nor is it known how to judge the optimal time for each student to experience each stage of glossing. The appropriateness of glossing in different sets of materials and at different levels of instruction remains to be studied.

Otto and his colleagues have advanced the use of glossing with a careful presentation of the theory and practice of this technique and how it interfaces with the various components of the reading process and content curriculum. In their future work, it seems that they will continue to investigate the questions which they have identified and those yet to be established.

There are other questions and problems which may deserve their attention. While it is the goal of this strategy to move students "systematically from one stage of the next", it is also important to identify guidelines to prepare the teacher to monitor student progress. How will it be determined whether students are maintaining and generalizing their use of the varied skills and strategies? How will it be determined when teacher intervention can be "faded"? Perhaps a method such

as the protocol analysis presented by Olshavsky (1976-1977), which asks the students to talk about what they do and think as they read would be useful to determine how students are "processing" the material.

Another question relates to how teachers could individualize the process and skill learning for students. While it may be virtually impossible to prepare a different gloss for each student, methods to adjust and monitor the gloss notations seem to be essential.

Marginal glossing could produce fragmented learning unless accomodations are made in the process of developing the notations. Each marginal notation may help the student understand a section of the text, but the separate notations may not lead to an integrated learning of several ideas. Notations which review previously learned concepts and relate new information to prior learning, and the use of reading-study guides in addition to glossing could facilitate integrated learning. Asking students to talk about their interpretation of the reading and what they were thinking as they studied may be another method to promote integration of ideas.

Otto and his colleagues have made significant contributions to the use of glossing as a technique to help students learn to learn. They have clarified the theory and issues of glossing and have presented a systematic procedure for developing gloss notations. Through their precise study of this strategy, they have identified questions which need to be answered. Research which evaluates classroom practices is needed to further refine the use of this strategy. Glossing has great potential as a method which develops the product and process of comprehension.

REFERENCES

Olshavsky, Jill Edward. Reading as problem solving: an investigation of strategies. *Reading Research Quarterly*, vol. 12 (4), 1976-1977, pp. 654-674.

Otto, Wayne, Sandra R. White, Donald Richgels, Ruth Hansen, and Beverly S. Morrison. Part 1. *A technique for improving the understanding of expository text: Gloss.* Part 2. *Examples of gloss notation.* Theoretical Paper No. 96, Wisconsin Center for Education Research, November, 1981.

Singer, Harry and Dan Donlan. *Reading and learning from text.* Boston: Little, Brown and Company, 1980.

USE OF STUDENT-GENERATED QUESTIONING PROCEDURES TO STIMULATE AND PROMOTE READING COMPREHENSION SKILLS OF STUDENTS

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Teachers have been advised, instructed, and urged to use questions and questioning procedures for successive periods over the years. (Hasty examination of the teacher's guides or manuals which accompany various basal reading series for the primary grades will help in quick verification of this.); and they have been and are doing so with relatively great frequency. Various strategies for using questions have evolved and been proposed for guiding readers into doing effective reading of text, especially since the time of Thorndike's oft-cited 1917 report, (Thorndike, 1917), Thorndike suggested that exercises with oral reading be replaced by silent reading in which the student be "guided" in his reading to find the answers "to given questions or to give a summary of the matter read, or to list questions which it answers" (1917, p. 332). Since Thorndike's time, many reading strategies have been proposed to guide readers in the reading of text; and one of the more frequently used steps in these strategies is the use of questions. (E.g., Washburne, 1929; Robinson, 1941; Gerken, 1953; Wrenn and Larsen, 1955; Morgan and Deese, 1957, Robbins, 1957; Hare and Pulliam, 1980).

Utilization of questions during reading may take two forms. Most frequently the form is one which makes use of teacher-prepared, author-prepared, or text or commercially-prepared questions. Less frequently used is the technique which involves student preparation or generation of questions over the material read or being read. On the basis of such earlier studies as those reported by Germane (1920), by Distad (1927), by Washburne (1929), and by Holmes (1931), and results obtained in many other studies since then, it has generally been conceded that teacher-developed or generated, or other-than-student-generated, questions serve to facilitate reading comprehension and recall. More recently, the effect, nature, and types of questions used and question location and frequency within a prose passage have been the concerns in a number of studies, such as those by, e.g., Frase (1967, 1968); Frase, Patrick, and Schumer (1970); Rothkopf, (1966); Strollo and Bliesmer, (1972); Watts and Anderson, (1971); and in a recent review of the literature by Anderson and Biddle (1975).

Particular impetus was given to studies in this area by Rothkopf's introduction of the term or concept, "mathemagenics," in the 1960's (see, e.g., Rothkopf's 1966 report and Frase's of 1968.) and by Rothkopf's and Frase's extensive research in this area. Many of the mathemagenics studies have also indicated that questions have facilitative effects on recall and that this recall is enhanced when questions come at the ends of passages rather than at other positions. (Bruning, 1968; Frase, 1967, 1968; Rothkopf& Bisbicos, 1967). This has not been a consistent finding, however. Strollo and Bliesmer (1972) found that none of their five treatment conditions (questions before or after selections or passages, interspersed before or after short sections within passages, or no questions) yielded results significantly superior to any of the other treatments. (It should be pointed out, however, that students in some of the groups had emotional problems and appeared to view questions as "test-like events" which, to them, were threatening.)

Benefits also appear to be stronger when student-constructed, rather than multiple-choice, responses are required. Further, higher level questions, such as inference-, evaluation-, and appreciation-type questions, seem to prompt more thorough study and recall and to improve incidental as well as specific learning and recall.

During the past several years, several investigators have been concerned with the effect on comprehension of having students generate their own questions while reading, with the belief, as Morse has stated, "that students can direct their own attention to relevant material through self-questions." (Morse, 1975, p. 2). As a result of one of their studies, Frase and Schwartz (1975) also recommended that students should be urged to ask their own questions while reading so that they might better develop as independent readers. In their study, Frase and Schwartz assigned high school students to tutorial pairs and had them read a biographical passage of some 1,200 words which was divided into three sections. The partners of each pair alternated in generating and answering questions, after each had read the selection. Each partner then read the third selection and studied on his/her own. The means of the questioning and answering conditions test scores differed significantly from those obtained under the read/study condition; but they did not differ significantly from one another.

In a second experiment by Frase and Schwartz (1975), college students (freshmen) read only the first two sections of the biographical passage, with each student generating questions about the first section as he read but reading and studying the second section without generating questions. Test scores obtained

revealed a significant difference in mean scores between the question-generating condition and the read/study condition.

In Schmelzer's study (1975), college student subjects were assigned to one of four treatment groups and read a logic text selection of approximately 1500 words. One treatment group previewed the passage for five minutes and then generated five questions about it; students in a second treatment group were given the passage divided into five sections and were instructed to read each section and generate a question covering the content of that section; a third group read the entire passage and generated five questions about it; the fourth group read the passage twice. While the effects, as judged on the basis of criterion test scores, were "not strong," each of the three questioning groups scored significantly higher than the read/reread group, when the high school rank factor was controlled.

Duell (1977) studied the effects of student-generated questions on comprehension of four passages which described psychological processes by assigning each of his college student subjects to one of three experimental groups. One group received the 4 passages, a list of objectives, and instructions to write questions to match the objectives; a second group was instructed to read and study the passage and the objective; the third group was instructed to take the criterion posttest without reading the passage. The criterion test included lower level, or recognition, items which required recognizing an example of a process copied from the text and higher level, or application, items which required identifying the names of the process represented by new examples of the process. Analysis of test scores revealed significant advantages for writing questions for both low and high level objectives over reading and studying the passages and objectives.

In a pilot study conducted by Chodos, Gould, and Rusch (1977), stndents in fourth grade classrooms were divided into 4 sections), and were then administered both an immediate and a delayed recall measure. Group 1 students read a 50-word prereading summary of each section and wrote four questions for which they might expect to find answers when reading the selection. Group 2 students generated questions following the reading of each section. Students in Group 3 were instructed to generate questions after reading each summary and also after reading each section (a combination of treatments 1 and 2). Group 4 students read and studied each section with a summary as an advanced organizer. Group 5 students were instructed to read and study each section. Students in Group 6 read and studied two sections at a time. Immediate recall test results indicated significant differences favoring the group which generated questions from a summary over the group which generated questions following the reading. However, on a delayed recall test (given a week later) the group which generated questions from a prereading summary was significantly superior only to the read/study group. There were indications that even poorer readers improved in ability to generate questions; facilitative effects of the student-generated question strategy were suggested; and significant differences found in immediate and delayed recall favored the group which generated questions from a pre-reading summary.

In a brief study reported by Andrei and Anderson (1978), rural high school seniors were assigned to either a questioning-with-training group or a read-reread group, with training in question-generating and administration of the *Wide Range Vocabulary Test* being done on one day and study of the two passages under the assigned treatment and the posttesting being done the second day. Results obtained indicated a greater effect of the question-generating strategy upon the performance of the low verbal ability student than upon that of the high verbal ability group, with the latter groups scoring about the same after the brief treatments, whether they had generated questions or read-reread. The investigators further reported, after analysis of the generated questions, that a definitely higher possibility of answering a posttest item correctly ensued after generation of a good comprehension question than after generation of a "less than adequate" one.

In a second experiment by Andrei and Anderson (1978), with the same reading passages and training materials, rural senior high school students were randomly assigned to a questioning-with-training, a questioning-without-training, or a read-reread group. The practice passage at the end of the training materials was replaced with one of the 3 reading passages; so each student practiced on one of the 3 passages on the first day and received the remaining 2 for experimental purposes on the second day.

Both the question with-training and the question-without-training groups scored higher on the criterion test than the read-reread group; but the two questioning groups did not differ from each other. Further analyses indicated significant interaction between treatment and verbal ability and between item type and verbal ability, with a significant main effect for treatment and verbal ability. It was also reported that the trained group generated a significantly greater percentage of good comprehension questions and that the probability of correctly answering a posttest item was greater after having generated a good comprehension question than after having generated a "less than adequate" question.

The results reportedly obtained in the Andrei and Anderson studies and the several others which involved study of effects upon comprehension of student-generated question strategies give strong indication that student-generated questions can effect improved comprehension and that training in question-generation can lead to improved skill in constructing good comprehension questions which, in turn, apparently has a positive effect on comprehension improvement.

However, in several reported studies, use of student-generated question strategies did not reveal any significantly different effects. Pederson (1976), in a study in which he used the same materials as those used by Schmelzer (1975), whose study was referred to earlier, reported that he was not able to replicate Schmelzer's results. Bernstein (1973), in a 1973 study and Owens (1977) in a later study were also unable to find an effect for student questioning during a study.

The senior presenter carried on a very brief exploratory probe with two classes of students enrolled in a college reading improvement program during the recent Fall Term. Approximately 40 students were involved. Materials used were rate-comprehension selections from a fairly-widely-used series of commercially-prepared practice materials. Each selection was 400 words in length, was of a lower-high school difficulty level, and was followed by ten commercially-prepared questions over the selection. At the beginning of each of 3 successive class sessions, students were given a selection and were instructed to read the selection and to write five good three-response, multiple-choice questions over the selection. During the first session, a brief discussion of what is involved in or what makes for a good multiple-choice item was conducted before the reading of the selection. After they had read a selection and had written the five items, students submitted their items and the selection and were then given the ten commercially-prepared items to answer. At the fourth session, following the third and last question-writing session, the purpose of the probe was briefly explained; and students were asked to make written comments or suggestions concerning the probe.

This exploratory study was not formally conducted; nor were results formally analyzed. However, student's comments, questions, and performance on commercially prepared questions were read, studied, and analyzed informally. A number of students remarked that many of their questions were practically the same as the commercially-prepared ones; study of their questions supported this. Several commented that they thought

their questions were better than those which accompanied the material; this seemed to be supported in a number of instances too. Some also commented that they thought they were comprehending a selection better by the third session; and perusal and cursory study of successive score changes tended to support this also.

The junior author of this paper also conducted a brief exploratory study with Grade 7 and Grade 8 students in his developmental and remedial reading classes in a Pennsylvania rural area school system. Students tended to respond favorably to this work. Brief exploratory efforts to give training to students in generating their own questions yielded some definitely positive indications.

The real present concern of the present authors of this paper is not only with the possibility of definite significant effects of student-generated question strategies upon reading comprehension skill but also with the possibility of training students in the use of this strategy and with the relative effects of such training at various stages of a student's school life or years. While a few reported studies have involved children at elementary school levels, the majority apparently has been with senior high school and college level students, who have had a considerable number of years to develop, establish, and reinforce skills, be they good or bad. What might be the influence of training in generating questions on the comprehension skills and habit of students at early school levels, such as the primary grades? What types of training might be most beneficial? How long a period might be necessary? How much will the length of training vary according to the level at which such training is started?

It was questions such as those just raised, and study of reports referred to in this presentation and others, which prompted planning for an exploratory study which was discussed in a presentation at this conference last year. (Bliesmer, McMurtrie, and Johnson, 1981). The carrying out of plans for exploratory research and probes which were anticipated in that earlier report were delayed, partly because of "Buckley amendment aftermath" and partly because of unforeseen administrative changes in schools in which subjects for the investigation were to be found. This led to considerable curtailing of the procedures planned and the conducting of the much-briefer-than-planned probes which have been referred to. Study of the various reports and other factors referred to have led to the planning of a study at the dissertation level; and final preparation for formal dissertation proposals are presently in progress.

REFERENCES

Anderson, R. C., and Biddle, W. B. On asking people questions about what they are reading. In G. Bower (Ed.), *Psychology of learning motivation* (Vol. 9). New York: Academic Press, 1975, 89-132.

Andrew, M.I.P.A., and Anderson, T. H. The development and evaluation of a self-questioning study technique. *Reading Research Quarterly*, 1978-79, *14*, 605-623.

Bernstein, S. L., the effects of children's question-asking behaviors on problem solution and comprehension of written material. Unpublished doctoral dissertation, Columbia University, 1973.

Bird, C., and Bird., D. M. *Learning more by effective study*. New York: Appleton-Century, 1945.

Bliesmer, E. P., McMurtrie, R., and Johnson, G. S. Relative effects of student-generated vs. teacher-generated questions on reading comprehension of elementary and secondary students: exploratory research and probes. Paper presented at meeting of American Reading Forum, Sarasota, Florida, December 2, 1980.

Chodos, L. B., Gould, S. M., and Rusch, R. R. Effect of student-generated pre-questions and post-statements on immediate and delayed recall of fourth grade social studies content. In F. David Pearson (Ed.), Reading: theory, research, and practice. *Twenty-Sixth Yearbook of the National Reading Conference*. Clemson, South Carolina: The Conference, 1977, 11-16.

Distad, H. W. A study of the reading performance of pupils under different conditions on different types of materials. *Journal of Educational Psychology*, April 1927, *18*, 247-258.

Duell, O. K. Overt and covert use of objectives of different levels. Paper presented at annual meeting of American Educational Research Association, New York, April, 1977.

Frase, L. T. Learning from prose material: length of passage, knowledge of results, and position of questions. *Journal of Educational Psychology*, October 1967, *58*, 266-272.

Frase, L. T. Effect of question location, pacing and mode upon retention of prose material. *Journal of Educational Psychology*, August 1968, *59*, 244-249.

Frase, L. T., Patrick, E., and Schumer, H. Effect of question position and frequency upon learning from text under different levels of incentive. *Journal of Educational Psychology*, February, 1970, 61, 52-56.

Frase, L. T., and Schwartz, B. J. Effects of question production on prose recall. *Journal of Educational Psychology*, October 1975, *67*, 628-635.

Gerken, C. D., *Study your way through school*. Chicago: Science Research Associates, 1953.

Germane, C. E. The value of the controlled mental summary as a method of studying. *School and Society*, December 1920, *12*, 591-593.

Hare, V. C., and Pulliam, C. A. Teacher questioning: a verification and extension. *Journal of Reading Behavior*, Spring 1980, *12*, 69-72.

Holmes, E. Reading guided by questions versus careful reading and rereading. *School Review*, May 1931, *39*, 361-370.

Morgan, C. T. and Deese, J. *How to study*. New York: McGraw-Hill, 1957.

Morse, J. M. Effect of Reader-generated questions on learning from prose. Unpublished doctoral dissertation, Rutgers University, 1975.

Robinson, Francis P. *Effective study*. New York: Harper, 1941.

Rothkopf, E. Z. Learning from written instructive materials: an explanation of the control of inspection behavior by testlike events. *American Educational Research Journal*, November 1966, *3*, 241-249.

Sehmelzer, R. V., Jr. The effect of college student constructed questions on the comprehension of a passage of expository prose. *Dissertation Abstracts International*, 1975, *36*, 162A.

Smith, E. P., *How to Study*. Lewiston, Maine: Echo Publishing, 1939.

Strollo, J. C., and Bliesmer, E. P. Practice effects of varying study question position on retention of learning-handicapped students. In P. L. Nache (Ed.), Diversity in Mature reading: theory and research. *Twenty-Second Yearbook of the National Reading Conference*. Milwaukee: The Conference, 1973, 62-70.

Thorndike, E. L., Reading as reasoning: a study of mistakes in paragraph reading. *Journal of Educational Psychology*, June 1917, *8*, 323-332.

Washburne, J. W. The use of questions in social science material. *Journal of Educational Psychology*, May 1929, *20*, 321-359.

Watts, G. H., and Anderson, R. C. Effect of three types of inserted questions of learning from prose. *Journal of Educational Psychology*, October, 1971, *62*, 387-394.

Wrenn, C. G., and Larson, R. P. *Studying Effectively* (2nd ed.). Stanford, Calif.: Stanford University Press, 1955.

MNEMONICS: EDUCATIONAL APPLICATIONS

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The purpose of this paper is to describe selected mnemonic techniques and to review research studies that validate the apparent benefits of these memory aids, with the primary focus on strategies and conditions that will facilitate the learning and retrieval of information and, thusly, improve comprehension in content classrooms. Through the use of memory systems, or mnemonics, spectacular displays of memory have been demonstrated with results that have specific applications to educational settings.

Unfortunately, some people think that the development of a good memory is like exercising a mental muscle by practicing

one rote exercise after another. Ebbinghaus (1964) showed the lack of any such analogous relationship when he found that the number of trials required to learn a list of twelve syllables by rote was fifteen times as great as that required to learn six syllables.

The importance of mnemonic devices for the facilitation of recall has been noted in recent surveys of the literature and related research (Ernest, 1977; Higbee, 1979; Hoffman & Senter, 1978). E.g., it has been found that the memory deficits of reading disabled children could be overcome by instruction in efficient mnemonic strategies (Torgesen, 1977) and that the problem solving ability of highly anxious subjects could be improved with memory aids (Gross & Mastenbrook, 1980). Further benefits from mnemonic training were demonstrated by Barclay (1979) when he reported that all his trained subjects maintained mnemonic strategies and showed transfer to new learning situations.

Only in recent years have mnemonics been considered serious and legitimate techniques in learning (Higbee, 1979). With the "knowledge explosion" adding an overwhelming amount of facts to our already vast mental store of data, more demands have been placed on the individual to learn, retain, and recall substantial amounts of this information. Bower (1973), concluding from his research that the basic facts must be learned before higher comprehension skills could be achieved, recommended that we teach mnemonic techniques just as we teach reading and writing.

Methods, Research, and Educational Applications

Peg-type Mnemonics

"Pegs," or schematically-organized concrete words, have been used to remember numerous items. Bower (1970; 1972) gave some guidelines on the use of peg-words, including these: (a) Both the peg-words and items to be remembered must be made to interact so as to form a single integrated image. (b) The peg-words must be generated easily by the subject or externally provided. (c) More than one item can be associated with a given peg-word, provided the items are elaborated into a unitary image. (d) Semantic similarity among peg-words impairs performance.

Wood (1967) reported the facilitation of recall when peg-words were used by subjects to learn response words and concluded that (a) recall is increased when a peg list is used, (b) there is a correct serial ordering with the peg, and (c) material in the middle of the list is not more difficult to learn than the items at the beginning or end. In addition, Hoffman and Senter (1978) found that with the use of a peg list, accuracy of recall did not decrease when subjects learned multiple lists of related items.

With the rhyming peg-word as described by Lorayne and Lucas (1974), each peg-word rhymed with the number indicating its position on the list such as "one is a bun, two is a shoe, three is a tree, four is a door, five is a hive, six are sticks, seven is heaven, eight is a gate, nine is a line, and ten is a hen." This scheme has been used by the author to remember lists such as the order of the presidents of the United States. Using the rhyming pegs, a visual image was made of each president and integrated with the peg-word. For example, George Washington was imagined wearing a bun in his hair (one is a bun). John Adams was pictured with a large *Adam's* apple and a *shoe* tied around his neck (two is a shoe). Thomas Jefferson was thought of as a Jef-fer(fir)-son tree (three is a tree), and so forth.

Logan (1955) proposed another peg system in which the peg-words sounded like their numbered positions: one is won, two is shoe, three is tee, four is gore, five is dive, six is kicks, seven is heaven, eight is bait, nine is dine, ten is hen, and so forth. Using the presidents again, the following sequence could be imagined: *Washington won* the Revolutionary War and the presidency; *Adams* wore a shoe in the Garden of Eden; *Jeff* was teaching his *son* to play golf so he set up the *tee*. This system could be elaborated to include the dates the presidents took office.

For long-digit number encoding, a system was described by Paivio (1971) which decoded the numbers into words by translating each number into a predetermined consonant sound, e.g.: One was equivalent to the sounds of *t, d,* and *th;* two was the *n* sound; three was *m*; four was *r*; five was *l*; six was *j, sh, ch,* and soft *g*; seven was *k*, hard *c*, and hard *g*; eight was *f, v,* and *ph*; nine was *p* and *b*; zero was *z, s,* and soft *c*. The vowels and *w, h, y,* had no value, but were added to the consonant sounds to create words or sentences. This system could be used to remember telephone numbers, dates, statistics, measurements, and so forth. When using this system to remember the dates the presidents took office, the author simply transposed the last two digits of the date to the appropriate consonant sounds, added vowels to make a concrete word, and associated the image with the president. Washington took office in 1789, so *8* and *9* became *f* and *b* respectively, from which the word *fob* was developed and used to imagine Washington with a bright watch *fob* and a bun in his hair. Adams was pictured with his shoe tied around his neck reading a *book* in the Garden of Eden as a cue for 1797, and so forth. Bower (1978) suggested the following sentence in aiding the recall of the consonant phonetic alphabet for digits from 0 to 9: *Satan may relish coffee pie.*

To visualize each letter of the alphabet, Lorayne and Lucas (1974) assigned highly visual words to the letters of the alphabet: A was ape, B was bean, C was sea, etc. With each assigned cue word sounding like its corresponding letter, recall was enhanced. This system was used to remember anything that contained letters, such as formulas and equations, style numbers, stock numbers, license plates, and difficult spelling words.

The literature has shown that peg-word mnemonics did not greatly increase recall performance when items to be learned were low imagery abstract words (Bellezza, 1981). However, by creating tangible words and sentences from abstractions, and then applying the peg-word system for retention, the learner was always "originally aware" of the number, formula, or list of vague facts to be remembered.

Keyword Method

When using a mnemonic device on a list of abstract words, either a semantic or phonetic encoding procedure might have to be applied to the list of items before they can be successfully associated with the mnemonic cue (Bugelski, 1970). The phonetic encoding technique, called the keyword of substitute word method, has been used effectively in teaching a second language (Atkinson, 1975; Atkinson & Raugh, 1975; Levin et al, 1979; Raugh & Atkinson, 1975). In using the keyword, a foreign word was presented and its English translation was to be remembered. An English word, the keyword, was found within the foreign word to be learned forming an interactive image between the keyword and the English translation of the foreign word. For example, the Spanish word *perro* (pronounced pear-oh) which means *dog*, could be remembered by associating the keyword *pear* with *dog* such as having a visual picture of a dog eating a pear (Bellezza, 1981).

Pressley and Dennis-Rounds (1980) found the keyword strategy effective with 18 year-olds who learned a list of cities paired with their products and showed transfer of the technique to a follow-up Latin learning task. Atkinson (1975) summarized the effectiveness of the keyword method when he reported gains in learning sentences, vocabulary, prose, and abstract concepts.

The Link

Another method described as an aid in remembering a list was the link mnemonic. The procedure was to form a visual picture associating the first and second words of the list, then forming a completely different image connecting the second and the third, third and fourth, and so forth. The overlapping series acted as chains, and have been shown to improve recall

in a serial learning task (Delin, 1969).

With the story mnemonic (Bower & Clark, 1969), a linking device in serial learning, the user incorporated each successive word on a list into a story that was created as the items were presented. There was little difficulty in distinguishing the items from the words in the story and little interference from other previously formed stories.

Lorayne and Lucas (1974) described the story link procedure after the following news item was read by students for factual recall: "In the history of railroading, few tracks have been laid faster than those of the Tanzam Railway in Zambia. At this moment, it is moving from the Port of Dar es Salaam to Zambia's copper belt" (p. 180). This news item described Zambia and its railway, so a link should be started with a "heading" picture, a substitute thought that would be a reminder of Zambia. The authors used *zombie* as a start of the link for Zambia. They pictured a *zombie walking* very *fast* along a *railroad track;* the sun was so hot that it *tans 'im.* This ridiculous picture was a vivid reminder that in Zambia, the railroad tracks were being laid very quickly, and the railway was the Tanzam Railway. In continuing the link, *There is salami* (Dar es Salaam) falling on the *zombie's copper belt.* Millions of pieces of salami were imagined falling, and if a more detailed cue was needed to remember Dar es Salaam, a person could be visualized pointing to a huge salami and saying, "There is salami!"

According to Lorayne and Lucas (1974), applications of the story link were found to slow down reading until proficiency was established, but once expertise was acquired, subjects remembered what they read or what they chose to remember. The link system could be used with all types of reading materials.

Single-use Mnemonics

Information that should be remembered permanently may have been learned with distinct organizational mnemonics. These mnemonics have sometimes been referred to as "ad hoc" mnemonics (Hunter, 1977). A variety of these mnemonics has been used by both children and adults.

Rhymes have been good at establishing order relations because any mistake in recall destroys the rhyme. Easy to learn and apply, the following rhymes have been commonly used: Use *i* before *e* except after *c*, and, Thirty days hath September, April, June, and November. Baddeley (1976) wrote a rhyme that would allow math enthusiasts to reproduce the value of Pi to the first twenty decimal places by counting the number of letters in each word:

Pie.
I wish I could remember Pi.
Eureka, cried the great inventor.
Christmas pudding! Christmas pie!
Is the problem's very center.

Reduction coding was developed to eliminate irrelevant information, thus reducing the amount that has to be stored. First-letter mnemonics are examples: (a) ROY G. BIV helps recall the colors of the spectrum—red, orange, yellow, green, blue, indigo, and violet. (b) HOMES cues the names of the Great Lakes—Huron, Ontario, Michigan, Erie, and Superior.

Adding information beyond what was strictly necessary has been characteristic in elaboration coding. For example, (a) **R**ichard **o**f **Y**ork gains **b**attles **i**n **v**ain is another way of recalling colors of the spectrum. (b) **E**very **g**ood **b**oy **d**oes **f**ine tells the lines on a music staff. (c) **M**en **v**ery **e**asily **m**ake **j**ugs **s**erve **u**seful **n**octurnal **p**urposes. This sentence codes the nine planets in their order from the sun—Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto.

Little research has been done on single-use mnemonics as a method of learning to be compared with other alternative instructional systems. It was found, however, that through the continued use of information learned by a mediating mnemonic, the information became more spontaneous and the use of the mnemonic aid declined (Atkinson & Raugh, 1975).

Method of Loci

The method of loci, used by Roman orators to remember speeches, was one of the oldest and most influential mnemonic devices described in Roman books on rhetoric (Yates, 1966). A large number of places in some public building or home were memorized in strict serial order, such that each locus (location) could be clearly visualized from memory. The sections of the speech were reduced to visual images where each image represented an important idea. Each image was placed in the corresponding locus, and the locus was a cue for recall of the image which in turn suggested the idea to be incorporated into the speech.

Snowman, Krebs, and Lockhart (1980) demonstrated the advantages of teaching the method of loci to high-risk college freshmen. The memonics group significantly increased their ability to retrieve factual information from prose while a similar group trained in notetaking, main ideas, and vocabulary development showed negligible improvement. Another group of college students trained in the method of loci had significant better recall and higher grade point averages than those students who did not use any mnemonic system (Carlson et al, 1976).

Conclusions

Although there has been an interest in recent years on the use of mnemonic systems in improving the memory, such interest has been expressed more by the layperson than the educator. Some researchers may think that research on mnemonics is an "unscientific venture," a meaningless pastime of observing gimmicks by entertainers. Several researchers who experimented with mnemonics in the 1950's and early 1960's did not publish their results due to the prejudices against mnemonics at the time (Hoffman & Senter, 1978). Pauk (1974) advised that "Such systems are fun at parties, but hardly applicable for serious studying and learning" (p. 77).

It has been demonstrated that mnemonic systems used in laboratory settings and classroom contexts have had a significant influence on memory performance. Now that attitudes have become more positive toward the study of mnemonics, research should be continued to extend the apparent benefits of mnemonic systems into the classroom. It is becoming increasingly evident that mnemonics are effective aids to recall and should be taught to students as a legitimate part of the school curriculum.

REFERENCES

Atkinson, R. C. Mnemotechnics in second-language learning. *American Psychologist,* 1975, *30,* 821-828.

Atkinson, R. C., & Raugh, M. R. An application of the mnemonic keyword method to the acquisition of a Russian vocabulary. *Journal of Experimental Psychology: Human Learning and Memory,* 1975, *104,* 126-133.

Baddeley, A. D. *The psychology of memory.* New York: Basic Books, Inc., 1976.

Barclay, C. R. The executive control of mnemonic activity. *Journal of Experimental Child Psychology,* 1979, *27,* 262-276.

Bellezza, F. S. Mnemonic devices: Classification, characteristics, and criteria. *Review of Educational Research,* Summer 1981, *51* (2), 247-275.

Bower, G. H. Imagery as a relational organizer in associative learning. *Journal of Verbal Learning and Verbal Behavior,* 1970, *9,* 529-533.

Bower, G. H. Mental imagery and associative learning. In L. W. Gregg (Ed.), *Cognitive learning and memory,* New York: Wiley, 1972.

Bower, G. H. How to . . . uh . . . remember. *Psychology Today,* 1973, *7* (5), 63-70.

Bower, G. H. Improving memory. *Human Nature,* February 1978, 65-72.

Bower, G. H., & Clark, M. C. Narrative stories as mediators for serial learning. *Psychonomic Science,* 1969, *14,* 181-182.

Bugelski, B. R. Words and things and images. *American Psychologist,* 1970, *25,* 1002-1012.

Carlson, R. F., Kincaid, P., Lance, S., & Hodgson, T. Spontaneous use of mnemonics and grade point average. *The Journal of Psychology*, 1976, *92*, 117-122.

Delin, P. S. The learning to criterion of a serial list with and without mnemonic instructions. *Psychonomic Science*, 1969, *16*, 169-170.

Ebbinghaus, H. *Memory: A contribution to experimental psychology.* (H. A. Ruger & C. E. Bussenius, Eds. and trans.). New York: Dover, 1964.

Ernest, C. H. Imagery ability and cognition: A critical review. *Journal of Mental Imagery*, 1977, *2*, 181-216.

Gross, T. F., & Mastenbrook, M. Examination of the effects of state anxiety on problem-solving efficiency under high and low memory conditions. *Journal of Educational Psychology*, October 1980, *72*, 605-609.

Higbee, K. L. Recent research on visual mnemonics: Historical roots and educational fruits. *Review of Educational Research*, Fall 1979, 49 (4), 611-629.

Hoffman, R. E. & Senter, R. J. Recent history of psychology: Mnemonic techniques and the psycholinguistic revolution. *The Psychological Record*, 1978, *28*, 3-15.

Hunter, I. M. L. Imagery, comprehension, and mnemonics. *Journal of Mental Imagery*, 1977, *1*, 65-72.

Levin, J. R., Pressley, M., McCormick, C. B., Miller, G. E., & Shriberg, L. K. Assessing the classroom potential of the keyword method. *Journal of Educational Psychology*, October 1979, *71*, 583-594.

Logan, A. L. *Remembering made easy.* New York: Arco Publishing Company, 1955.

Lorayne, H., & Lucas, J. *The memory book.* New York: Random House, 1974.

Paivio, A. *Imagery and verbal processes.* New York: Holt, 1971.

Pressley, M., & Dennis-Rounds, J. Transfer of a mnemonic keyword strategy at two age levels. *Journal of Educational Psychology*, 1980, *72*, 575-582.

Raugh, M. R., & Atkinson, R. C. A mnemonic method for learning a second-language vocabulary. *Journal of Educational Psychology*, 1975, *67*, 1-16.

Snowman, J., Krebs, E., & Lockhart, L. Improving recall of information from prose in high-risk students through learning strategy training. *Journal of Instructional Psychology*, Winter 1980, *7* (1), 35-40.

Torgesen, J. K. Memorization processes in reading-disabled children. *Journal of Educational Psychology*, 1977, *69*, 571-578.

Wood, G. Mnemonic systems in recall. *Journal of Educational Psychology*, December 1967, *58*, (6), 1-27, (pt. 2).

Yates, F. A. *The art of memory.* London: Rutledge & Kegan Paul, 1966.

VYGOTSKY'S THEORY OF INTELLECTUAL DEVELOPMENT: THE EFFECTS OF SUBJECT-MATTER INSTRUCTION ON SELF-REGULATED COGNITIVE PROCESSES

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Results of current research suggest that text comprehension depends on students actively using background knowledge and executive routines for regulating their own comprehension and learning performance (Bransford, 1979; Brown, Campione, & Day, 1978). One implication of such findings is that comprehension processes and conceptual development are closely related. While researchers have formulated elaborate theories of how knowledge is represented in memory and subsequently used to process information in texts, much less is known about how students acquire new knowledge structures and strategies for controlling their own learning (Kintsch, 1980). Reading educators and researchers realize that instruction in content areas influence the concepts students acquire and use to study and understand their textbooks. Nevertheless, few researchers have examined specifically (1) how content area instruction affects the knowledge structures and cognitive abilities students develop as they progress through school, or (2) how this type of development interacts with and influences students' ability to comprehend and learn from subject-matter texts.

Perhaps the most widely known theory of conceptual development is that of Piaget (Kuhn, 1979). Educators have relied on Piaget's work for several decades to help themselves understand the intellectual capabilities of children and adolescents. Recently, experimental psychologists also have borrowed from Piaget's theory to explain processes underlying comprehension and memory performance (Brown, 1980). Piaget, however, did not consider instruction and school experiences to be factors that influenced conceptual development in children (Duckworth, 1979). Indeed, a common interpretation of Piaget's theory is that intellectual development results from maturation or biological processes; therefore, children can achieve mature forms of intellectual functioning even if they are not exposed to the types of knowledge and instruction provided by teachers in schools.

The purpose of this paper is to describe briefly an alternative theory of cognitive development. I will focus on the theory formulated by Vygotsky, a Soviet psychologist, because he proposed that instruction in and mastery of subject-matter knowledge are the primary forces underlying cognitive growth (Vygotsky, 1962, 1978, 1979). Since Vygotsky developed his theory nearly fifty years ago, I will begin by discussing why his theory is still relevant to current issues in edicational research. I will then summarize his ideas about (1) the origins of higher intellectual operations and (2) the self-regulatory functions of inner-speech. Finally, I will describe global implications Vygotsky derived for educational practice and how these implications apply to comprehension instruction for unsuccessful students.

Vygotsky's Influence on Current Research

Because Vygotsky died in 1934, many readers might assume that his work has no current value. Such an assumption would be incorrect for at least two reasons. First, Vygotsky (1978, 1979) saw social interactions among teachers and students as well as instruction in formal school disciplines as central to children's acquisition of knowledge and self-regulatory skills. A basic premise of his theory is that psychologists will not be able to understand or explain highly developed cognitive skills in adults until they discover how school instruction affects cognitive development in children.

Many comparative psychologists who study cross-cultural differences in memory performance attribute their interest in this area to Vygotsky's hypotheses about the effects of formal school instruction on intellectual development (Cole & Scribner, 1974). Results of these studies raise serious questions about the universality of Piaget's stage model; and, they support Vygotsky's assumption that children's acquisition of conceptual skills varies as a function of the type of education they receive and the level of literacy they achieve (Wagner, 1978; Scribner, 1979).

A second reason Vygotsky's work still has current value is related to his research on the self-regulatory functions of inner-speech. The basic conclusion Vygotsky (1962) derived from his research is that without instruction in subject-matter areas, students cannot develop insights about how their own minds work and, therefore, do not develop the ability to use language (inner-speech) to guide, monitor, and control their own learning. Although American psychologists have not directly addressed the issue of inner-speech as it relates to learning in content area disciplines, the theoretical functions of inner-speech described by Vygotsky underlie (1) current discussions about the construct of metacognition (Brown, 1978), and (2) current research designed to improve the academic performance of unsuccessful students by training them to use executive routines or self-interrogatory strategies (Meichenbaum, 1977; Brown, Campione, & Barclay, 1979).

The Social Origins of Intellectual Development

What distinguishes Vygotsky's theory from the schema theories of Piaget and others is Vygotsky's claim that all higher level cognitive processes arise out of social experience. Each intellectual function a person acquires, like voluntary attention, concept formation, and deliberate memory strategies, must appear two times: first at a social, external level between individuals, and then at a personal, internal level within an individual. Transfer from external (social) to internal (individual) planes results from a prolonged series of events; but once a function is internalized, the structure and organization of one's mind is changed, moving individuals to higher levels of conceptual ability.

For example, children were seen to acquire symbolic processes like spoken and written language by interacting with their parents, teachers, and other adults. Such interactions allow children to identify and abstract effective means for speaking, remembering, and problem-solving. Internalization occurs only after children have first used cognitive operations in situations where adults or experts verbally mediate and regulate their performance. Gradually children transform or reconstruct these external operations and the means for regulating the operations so that they occur internally. Some operations may always remain external; but if an operation is internalized, the structure of the child's mind is reorganized, creating new abilities in the child which would not have existed otherwise (Levina, 1979).

Thus, Vygotsky proposes that cognitive development results from learning experiences in which children are taught to use various intellectual or cognitive skills through social interactions with others. A basic implicaion of his theory is that the structure and quality of the intellectual abilities children develop reflect the structure and quality of the social interactions children have had with their parents and other adults. Vygotsky's emphasis on the social origins of development makes his theory of cognitive development distinct from the theories of most Western psychologists (Wertsch, 1979a).

The Development of Self-Regulatory Speech Functions

While Vygotsky saw all higher mental functions arising out of social interactions, he was basically interested in the regulatory or executive functions of inner-speech (Wertsch, 1979b). Vygotsky's description of innerspeech functions mirrors the American construct of metacognition (Brown, 1978; Flavell, 1979). In both constructs, inner-speech and metacognition, self-regulatory skills are defined as routines people use to plan, monitor, and direct their own cognitive behavior based on insights they have about how their own minds work. For each cognitive function people acquire, like text comprehension, self-regulation appears only after the function has been used and practiced unconsciously for long periods of time. Vygotsky's construct of inner-speech differs from the American construct of metacognition in that Vygotsky (1) emphasized self-regulation as a language function children acquire through social interactions with their parents, teachers, and peers; and (2) attributed the development of this function specifically to students having to learn abstract concepts such as those taught in the academic courses of most schools.

Vygotsky (1962, 1979) defines inner-speech as language used to mediate thinking. The roots of this language function lie in children's acquisition of oral speech, or the ability to respond to and communicate with other people. Inner-speech, however, only develops as students learn ideas that reflect culturally shared and accumulated knowledge. Since schools are established to transmit this type of knowledge, Vygotsky proposed that school instruction induces two interrelated types of cognitive function concept formation and self-regulation.

Concept Formation

Vygotsky (1962, 1979) argues that by learning concepts in school students acquire a type of knowledge that is fundamentally different from conecpts they acquire through everyday experience. For example, children can acquire and understand a concept like "brother" based on their everyday activities; but they cannot acquire and understand concepts like "manifest destiny" or "exploitation," unless someone teaches them history or other school concepts which make these theoretical ideas meaningful. School concepts are abstract, divorced from concrete experience, and have to be learned as systems of ideas that are organized in superordinate, coordinate, and subordinate relations. Learning such systems creates hierarchial knowledge structures in students which enable them to classify and generalize ideas and to think in relational terms. Students must practice these thinking skills or operations unconsciously under adult guidance before they can subject the operations to deliberate direction and control. But once students grasp the significance of the structure of relations between ideas in one content area, they can transfer and use this type of knowledge to learn more complex concepts in that area as well as concepts in other domains of school instruction.

Self-Regulation

According to Vygotsky (1979), as students acquire new knowledge, they also acquire routines for regulating and controlling their use of that knowledge. Self-regulation occurs only after students perceive the significance of structural relations among concepts and only after teachers have verbally mediated and guided students' use of the concepts for extended periods of time. From these mediated learning experiences, students eventually acquire language for regulating their own learning, and they do so by reconstructing in their own minds the speech or language forms teachers use to teach them (Wertsch, 1979a, Vygotsky, 1979). Through instruction, students learn what it means when a teacher asks them to remember, interpret, classify, compare, or judge ideas. Understanding these terms and the cognitive operations they label gives students insights about the functions of their own minds. These insights are what enable students to use language consciously to mediate and regulate their own thinking and study behavior.

To briefly summarize, Vygotsky describes self-regulation as an inner-speech function. This function emerges after students have had guided instruction and practice in using abstract ideas like those taught in subject-matter disciplines. His basic hypothesis is that the structure of inner-speech forms students use to control their own thinking reflects the structure of the language their teachers used in teaching.

Both the nature (inner-speech) and the origins (content area instruction) of self-regulation that Vygotsky proposed are obscured in most American research on executive functions or metacognitive routines. Instead, American researchers have simply identified and described such things as (1) the age at which students demonstrate different insights about their own cognitive abilities; (2) the difference between good and poor readers use of self-regulatory or executive functions; and (3) the executive strategies adults use to monitor and control their own comprehension and learning (Kreutzer, Leonard, & Flavell, 1975; Brown & Smiley, 1977; Myers & Paris, 1978; Baker, 1979; Owings, Peterson, Bransford, Morris & Stein, 1979).

Neither the content students are expected to learn nor the type of verbal instruction they receive are major variables in American research. Yet, if Vygotsky is correct, American researchers must control for these variables in order to explain (1) how students develop routines for controlling their own learning and (2) why some students learn to monitor and control their own study behaviors better than others.

Educational Implications

Since Vygotsky observed that instruction, or mediated learning, typically preceded the acquisition of cognitive abilities, he concluded that "the only good kind of instruction is that which marches ahead of development and leads it" (Vygotsky, 1962, p. 104). Because of this, Vygotsky criticized psychologists who recommended that teachers match instruction to developmental levels of students as determined by their scores on standardized tests. He felt this was misguided because it focused instruction on abilities students had acquired in the past instead of abilities students could potentially achieve in the future.

As previously noted, Vygotsky claims that both the content students learn and the ways teachers mediate student learning influence the knowledge structures students acquire and their ability to activate, or regulate, their own use of that knowledge. Vygotsky (1978) was especially opposed to education programs designed for unsuccessful students in which instruction was aimed at the students' independent level of performance and based only on concrete experiences and concepts. Instead, he felt teachers and schools should push these students in particular to learn abstract ideas and complex cognitive skills. According to Vygotsky, offering unsuccessful students an academically less rigorous curriculum reinforces their learning handicaps and keeps them from acquiring higher levels of cognitive ability.

In many American schools, unsuccessful students are usually those students who have difficulty learning from subject-matter texts. Because they cannot learn by reading textbooks, they are typically (1) tracked into courses specifically designed for academically less capable students, or (2) sent to some sort of remedial class for reading instruction. In both instances, the intent is to match instruction to levels at which students can succeed and then move them to higher levels of academic performance. Vygotsky's theory can be interpreted to suggest, however, that many of the practices associated with classes designed for unsuccessful students may hinder rather than promote their acquisition of concepts and skills that underlie successful, self-regulated learning.

Instruction in content area courses designed for academically less capable students may perpetuate the learning difficulties these students have. Instruction in these classes often is modified so that students are expected to read less material and learn only concrete ideas or facts. Vygotsky argues, however, that the concepts students acquire in school directly affect the intellectual skills they develop. To Vygotsky, abstract concepts are tools of thought which dramatically alter the nature and structure of people's minds. Students who learn abstract concepts, therefore, develop more powerful thinking skills than students who do not learn abstract concepts. Thus, teaching students only concrete ideas and expecting them to apply the ideas by reading less material may maintain students at lower levels of academic and cognitive achievement. As an alternative, Vygotsky suggests that teachers modify the way they mediate and regulate how less capable students learn instead of simply modifying what they expect these students to learn.

A similar problem may occur in remedial reading classes. Perhaps remedial reading instruction helps students develop decoding skills. As it is usually organized, however, remedial instruction might not help students develop comprehension and learning strategies that can be transferred to subject-matter texts. The motivational, easy, and interesting materials used in most remedial classes can seldom be used to teach students ideas that are abstract, related in complex meaning structures, and divorced from students' personal experience or past learning. Yet, according to Vygotsky, only through mastery of this type of knowledge can transfer occur from one domain of instruction to another. Thus, we may maintain unsuccessful students at low levels of comprehension development by not expecting them to understand, remember, and apply abstract knowledge that can be transferred and applied to understanding subject-matter texts.

REFERENCES

Baker, L. *Comprehension monitoring: Identifying and coping with text confusions.* (Tech. Report No. 145). Urbana, Illinois: Center for the Study of Reading, University of Illinois, September, 1979.

Bransford, J. D. *Human cognition: Learning, understanding, and remembering.* Belmont, Calif: Wadsworth Publishing Co., 1979.

Brown, A. L. Knowing when, where, and how to remember: A problem of metacognition. In R. Glaser (Ed.), *Advances in Instructional Psychology.* Hillsdale, N.J.: Erlbaum, 1978.

Brown, A. L. *Learning and development: The problems of compatibility, access, and induction.* (Tech. Report No. 165). Urbana, Illinois: Center for the Study of Reading, University of Illinois, March, 1980.

Brown, A. L. Campione, J. C., and Barclay, C. R. Training self-checking routines for estimating test readiness: Generalization from list learning to prose recall. *Child Development,* 1979, *50,* 501-512.

Brown, A. L., Campione, J. C., and Day, J. D. Learning to learn: On training students to learn from texts. *Educational Researcher,* 1981, *10,* 14-24.

Brown, A. L. and Smiley, L. S. Rating the importance of structural units of prose passages: A problem of metacognitive development. *Child Development,* 1977, *48,* 1-8.

Cole, M. and Scribner, S. *Culture and thought: A psychological introduction.* New York: John Wiley and Sons, Inc., 1974.

Duckworth, E. Either we're too early and they can't learn it or we're too late and they know it already: The dilemma of "applying Piaget." *Harvard Educational Review,* 1979, *49,* 297-312.

Flavell, J. H. Metncognitive and cognitive monitoring. *American Psychologist,* 1979, *34,* 906-911.

Kintsch, W. Learning from text, levels of comprehension, or: Why anyone would want to read a story anyway. *Poetics,* 1980, *9,* 87-98.

Kreutzer, M. A., Leonrd, C. and Flavell, J. H. An interview study of children's knowledge about memory. *Monographs of the Society for Research in Child Development,* 1975, *40* (1, Serial Number 159).

Kuhn, D. The application of Piaget's theory of cognitive development to education. *Harvard Educational Review,* 1979, *49,* 340-360.

Levina, R. E. L. S. Vygotsky's ideas about the planning function of speech in children. In T. V. Wertsch (Ed. and trans.), *The concept of activity in Soviet psychology.* Armonk, NY: M. E. Sharpe, Inc., 1979.

Myers, M. and Paris, L. Children's metacognitive knowledge about reading. *Journal of Educational Psychology,* 1978, *70,* 680-690.

Meichenbaum, D. *Cognitive behavior modification: An integntive approach.* New York: Plenum Press, 1977.

Owings, R. A., Peterson, G. A., Bransford, J. D., Morris, C. D. and Stein, B. S. Spontaneous monitoring and regulation of learning: A comparison of successful and less successful fifth graders. *Journal of Educational Psychology,* 1980, *72,* 250-256.

Scribner, S. Modes of thinking and ways of speaking: Culture and logic reconsidered. In R. O. Freedle (Ed.), *New direction in discourse processing.* Norwood, NJ: Ablex, 1979.

Vygotsky, L. S. *Thought and language* (E. Haufman and G. Vakar, Eds and Trans). Cambridge, Mass: The M.I.T. Press, 1962.

Vygotsky,, L. S. *Mind in society: The development of higher psychological processes.* (M. Cole, V. John-Stiener, S. Scribner, and E. Touberman, Eds. and Trans.). Cambridge, Mass: Harvard University Press, 1978.

Vygotsky, L. S. The genesis of higher mental function. In T. V. Wertsch (Ed. and Trans.), *The concept of activity in Soviet psychology.* Armonk, NY: M. E. Sharpe, Inc., 1979.

Wagner, D. A. Memories of Morocco: The influence of age, schooling and environment on memory. *Cognitive Psychology,* 1978, *10,* 1-28.

Wertsch, T. V. *The concept of activity in Soviet psychology.* Armonk, NY: M. E. Sharpe, Inc., 1979.

Wertsch, T. V. From social interaction to higher psychological processes: A clarification and application of Vygotsky's theory. *Human Development* 1979, *22,* 1-22.

ADJUNCT AIDS AND TEACHER REGULATION OF LEARNING FROM TEXT

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"Prose text appeals to premises and rules of logic for deriving implications. Whether or not premises correspond to common sense is irrelevant. All that is critical is that the premises are explicit and inferences correctly drawn. The appeal is formal rather than intuitive. As a consequence, the criterion for the success of a statement in explicit prose text is its formal structure; if the text is formally adequate and the reader fails to understand, that is the reader's problem. The meaning is in the text." (Olsen, 1977, p. 277)

"Instruction is one of the principal sources of the school child's concepts and is also a powerful force in directing their evaluation; it determines the fate of his total mental development." (Vygotsky, 1962, p. 23)

An ancient philosopher once stated awareness of difference precedes awareness of likeness. In examining the views stated above, the development of models and theories of text processing (basic research) should lead us to the relationship of those models with the real world of classroom instruction (applied research). Unfortunately, that cognitive leap has not seemed to occur. The widespread use of adjunct aids of published textbooks is minimum at best. Since the use of questions and aids thus falls to the purview of teachers, the teachers' role in eliciting meaning from text should be central. Unfortunately, this has not been the case. This paper is an attempt to 1) examine the literature for evidence of teacher regulation of text, 2) propose a new mindset for future research in development of adjunct aids, i.e., the training component and, 3) to raise once again the ugly question of effectiveness of adjunct aids and for whom, under what conditions? Recognizing that the questions are interrelated, so hopefully will be the discussion. Most of the research chosen for the examination in this paper will focus on teacher and student interaction with text. There are a few studies and/or theoretical papers that have attempted to span the bridge from conceptualization to application, but the most promising note is the number of researchers who call for textbook publishers and teachers to become part of the team. Vygotsky, the noted Russian psychologist, addressed this same matter. He felt instruction to be imperative; that children should move from dependence to independence in language acquisition and reasoning and that the main vehicle for this movement msut be direct instruction. Adjunct aids are a means of achieving that independence while reading thus setting in motion that "inner speech" that tells children they comprehend and as importantly, an instructional device for teachers in helping their youngsters to *become* independent readers.

Rothkopt (1981) has drafted a "second assault" addition to the literature of adjunct aids and mathemagentic activities. He began his work in 1963 by manipulating interspersed questions into text. Other factions were indeed busy with the same line of pursuit, only their efforts were not limited to questions. Ausubel's (1960) work with advanced organizers, Barron's (1969), development of structured overviews, Manzo (1980), and Meeks (1979, 1980) with imbedded aids were all efforts to incorporate flexibility and comprehensive reading aids into otherwise immutable text. Rothkopt's current concern is that the relationship between information in text and instructional purpose is a neglected avenue of research (1981). For example, the selective functions of mathemagenic activities are in part regulared by the perceived importance of text elements. Thus, goal-descriptive directions are of value when there is a discrepancy between what the teacher and student perceive as important in the text.

In that goal-descriptive directions are not uniform and thus do not consistenty facilitate mathemagenic behaviors, we cannot conclude that the phrasing of goal descriptions interact with learning. Rothkopt is quick to point out, however, that teachers probably have intuitively formulated goal-descriptive directions, but very little systematic study has been done in this area to determine classifications of directions and with what impact these directions interact with levels of reading ability.

Rothkopt, incidentally, reported positive effects with students who were classified as "ineffective readers." However, he operationally defines "ineffective reader" by measuring how much or how little they learned from the first 24-pages of a 90-page science text, but also, who showed an increase in rate of reading (1972). This is an unusual result as poor readers seldom do well with adjunct aids; however, the definition of "ineffective readers" is hardly one that a seventh grade science teacher would use to describe his/her low ability readers.

In sum, adjunct aids problably make little contribution to text processing in schools. What is needed is a systematic model of application of both learning goals and adjunct questions. Teachers must have formulated text-directed goals and a prioritization scheme as to what is important in text processing. One suggested (and may I add divergent) technique might be a rating system of importance of statements. This procedure was developed by Manzo as one of a series of Imbedded Aids and tested by this author in her doctoral dissertation. The aid was labeled "Rating of Importance of Facts," parenthesis were placed at the end of each fact in a textbook. Students were instructed to rate the importance of each fact on a 1 (high) to 5 (low) scale. The rating of "1" indicated that the student perceived that fact as very important; the rating of "5" indicated that the fact was virtually unimportant. Students were to compare their rating to similar ratings of each fact placed in the margin by the author (or the teacher). If a wide difference between the two ratings occurred, students were instructed to re-read the paragraph and re-evaluate the importance of that fact.

A similar aid, "Rating of Understanding of Facts," was incoporated to further extend reader's monitoring of their own understanding. Each cluster of facts was enclosed in brackets and within the parenthesis placed beside the bracket, students were asked to indicate their understanding of that cluster on a 1 (high) to 5 (low) scale. The rating of "1" would indicate complete understanding and rating of "5" would indicate no understanding. Students were told that when understanding fell below a "2" rating, they were to seek help from the instructor.

Task differentiation is also one of the primary teacher behaviors that can affect text processing. Rothkopt challenges teachers to master strategies other than "read to learn." It would seem that inserted prediction devices might be applicable in purpose setting. Again a useful tool might be the format taken from the series of studies concerning Imbedded Aids. An example of such a device was the aid, "Making a Prediction." Based on facts in the chapter, students were asked to predict answers to specific questions. After an answer was predicted, they were instructed to check appropriate lines of text to determine if their prediction was correct. These aids were included in a cluster of other similar text extensions and labeled Reading/Thinking/Evaluating Skills. Good readers again showed better results than did poor readers. Students, however, were only given cursory instruction with the use of aids. In a second study, statistically significant results were found when the teachers were given systematic instruction in the use of aids in their reading assignments. In reflection, aids appeared to be means of expanding childrens' schema for reading the passages. Current research has not identified what effect schemata has on comprehension, but in the context of this notion, Anderson and Biddle (1975) remark "We do not need another demonstration that adjunct questions 'work,' (what we need to know) is why they work." (p. 108) I would add, and for whom?, and if they don't work for low readers, why not? My suspicion is that

low readers need more instruction and modifications with use of aids.

Schema theorists emphasize the role of cognitive readiness in acquiring meaning from text. However, only a few attempts at classroom research have been conducted to validate teaching strategies. Moore and Readence (1980) applied a meta-analysis technique on research relating to graphic organizers which was one of the early attempts to translate cognitive readiness into regular classroom methodology. Meta-analysis, a technique developed by Glass (1978), enables reviewers to look at research in a systematic statistical manner, or as they state an "analysis of analyses" (p. 213). What this analysis revealed is startling. Generally small effects were found for graphic organizers as a strategy for learning from text. Again the only population that benefitted was high verbal ability students while reading expository material, and yet three current secondary texts detail the use of graphic organizers. It would appear that application strategies preceded applied research.

Meyer's (1978) work is well-known for its thoroughness as well as its replicability. Her analyses of protocols conducted with ninth-grade students indicates that most high level ability readers used the same schema for organizing their recall of the passage while most low ability students did not. Palmer, Seater, and Graves (1980) re-examined Meyer's work in an effort to determine if simplifying reading passages would aid low ability ninth-grade students. The simplification of difficult vocabulary did not have a significant effect on either student's use of the author's schema or the amount of information they recalled. The notable adjustment to this study was that the materials developed were more similar in nature to those used in classrooms.

With the current emphasis on schema theory, the notion of recall and the qualifying of recalls must be examined. As Vygotsky so artfully stated, . . . "Rather than tapping the child's thinking, often we elicit a mere reproduction of verbal knowledge, in lieu of a study of intellectual process." With the low ability readers, I still do not believe we have tapped the process of reasoning.

Much more research needs to be conducted with these youngsters, looking indepth at their process of understanding text (or the lack thereof). So often in many studies, the subjects are not adequately described so that other research might replicate or extend hypothesis. Who are the children? What is their history of instruction? What sex, race, national origin makes up the experimental groups? Case study research is sorely needed at this juncture in time. Vygotsky would call this microgenetic research. I would modify the notion to study classrooms rather than an individual approach.

In the same vein, an article by Langer appeared in the November, 1981 issue of the *Journal of Reading* entitled "From theory to practice: A Prereading Plan." Langer states ". . . only general guidelines and a few instructional strategies have been available for helping students realize what they know and how to relate that knowledge to text. Teachers have experimented with ways to bridge the gap. Still, they support that these activities are not as successful as they would like, particularly with the poorest achievers . . . instruction can lead to ineffective intervention without the teacher really knowing what went wrong (p. 152)." Langer went on to describe a technique that she proposes, named Pre-Reading Plan or (PReP). She states that the theoretical framework for this technique is in press, but nowhere does she allude to the research conducted in developing the technique with "real-live" teachers and "real-live" children. Again we must ask, for whom does it work, at what level, in what scenario?

Pearson and Camperell (1981) state that the "renaissance of the methodological study is *now* (p. 50)" and that students do indeed learn new strategies for comprehending text when they are systematically taught. I would caution researchers to not fall victim to the findings of the First Grade Studies, but to examine the teacher variable very closely. Studies must investigate how good teacher uses adjunct aids, under that conditions, and with what results. We must develop a practical, working paradigm for text comprehension and I believe we are well on the way, but to use military jargon, "Let's don't send up a new plane without first teaching and training the pilot.

REFERENCES

Anderson, R. C. and Biddle, W. B. "On Asking People Questions About What They Are Reading." In G. Bower (ed.) *The Psychology of Learning and Motivation* (Vol. 9) New York: Academic Press, 1975.

Ausubel, D. P. "The Use of Advanced Organizers in The Learning and Retention of Meaningful Verbal Materials." *Journal of Educational Psychology*, 1960.

Barron, R. F. "The Use of Vocabulary as an Advance Organizer." In Harold Hurber and Peter Sanders, (eds.) *Research in Reading in the Content Areas: First Year Report*, Syracuse, New York: Syracuse University Press, 1969.

Glass, G. V. "Intergrating Findings: The Meta-Analysis of Research." In L. S. Schulmanz (ed.) *Review of Research in Education* (Vol. 5) Itasca, Ill. F. E. Peacock, 1978.

Langer, J. A. "From Theory to Practice: A Prereading Plan." *Journal of Reading*, November, 1981.

Manzo, A. V. and Sherk, J. K. "Imbedded Aids to Readers." *New England Journal of Reading*, 1980.

Meeks, J. W. "Imbedded Aids to Readers: An alternative Textbook Approach." *Reading Improvement*, Summer, 1979.

Meeks, J. W. "Effects of Imbedded Aids on Prose-Related Textual Material." *Reading World*, May, 1980.

Moore, D. W. and J. E. Readance. "A Meta-Analysis of The Effect of Graphic Organizers on Learning from Text." In the twenty-ninth yearbook of the National Reading Conference, M. L. Kamil and A. J. Moe (eds.), 1980.

Olsen, D. "From Utterance To-Text." *Harvard Educational Review*, August, 1977.

Pearson, P. D. and Camperell, K. B. "Comprehension of Text Structure." In J. T. Guthsie (ed.) *Comprehension and Teaching: Research Reviews*. International Reading Association, Newark, Delaware, 1981.

Rothkopt, E. Z. "Variable Adjunct Question Schedules, Interpersonal Interaction and Incidental Learning from Written Material." *Journal of Educational Psychology*, 1972.

Rothkopt, E. Z. "Adjunct Aids, and the Control of Mathemagenic Activites During Purposive Reading." *Bell Laboratories*, 1981.

Vygotsky, L. S. *Thought and Language*. M.I.T. Press: Cambridge, Massachusetts, 1962.

COGNITIVE PROCESS INSTRUCTION: NEW APPROACHES TO LEARNING IN SCIENCE

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The purpose of cognitive process instruction is to apply the techniques and insights on high-order human cognitive processes to problems in education in order to develop instructional programs that teach students how to think. Advocates of cognitive process instruction approach learning from a constructivist perspective. They reject the behavioristic influence on education which they feel has resulted in undue emphasis on product and neglect of process. They consider cognitive process instruction an applied science anchored in observation, and borrow techniques from biology, specifically, ethology or naturalistic observation. These investigators and advocates do not come from the mainstream of educational research; rather, they tend to be scientists, especially physical scientists and mathematicians, and their work has been done primarily with college students.

Essentially, the cognitive process instruction investigators are concerned with developing "good habits of mind." That notion obviously brings to mind "faculty psychology." Cognitive process instruction is like faculty psychology in that it does deal with the idea that disciplined and logical analysis can be taught. It is different primarily in the level of specificity possible. Logical thought is no longer conveyed through Latin; instead, more specific cognitive skills may be isloated and taught. Further the conception of learning is different—in cognitive process instruction the structure is not presented, the teacher is not the giver of knowledge. Instead the teacher is a tutor/coach who helps students develop their own knowledge systems—in other words, the constructivist perspective (Lochhead, 1979a).

Those people who are developing cognitive process instruction are well grounded in the traditional quantitative sciences and realize the limitation of quantitative approaches. Their methods stress naturalistic observation and contextual validity in realistic educational situations. They acknowledge it as a "messy science" on which to base tentative hypotheses, not firm conclusions.

In his discussion of approaches to cognitive process instruction research, Lin (1979) points out that cognitive process instruction is primarily clinical with the purpose of illuminating processes underlying behavior in complex intellectual domains. Therefore, it is concerned almost entirely with complex problems characteristic of higher education; i.e., those involved in solving a physics or math problem, composing an essay, or even understanding a complex text. The major tools are introspection and protocal analysis through "thinking aloud" or interaction with an interviewer with a concern for looking at "why" and "how" a student does what he does. A major goal is to make expert skills explicit, including not just content, but also the nonfactual and nonpropositional knowledge—procedures, heuristics, organization strategies, and values (Lin, 1979).

Most cognitive process instruction educators and researchers work from a descriptive perspective with an emphasis on educational engineering. Lin identifies four basic descriptive model-building frameworks that characterize the work related to cognitive process instruction. They are: (1) a developmental framework, (2) a micro-analytic framework, (3) a diagnostic framework, (4) an instructional or prescriptive framework. Obviously, since the aim of cognitive process instruction is instructional, specific models do not necessarily fit purely into only one framework. Models build on developmental, micro-analytical, or diagnostic frameworks usually have instructional implications, if not complementary prescriptive models.

The Developmental Framework

A model based on the developmental framework provides a developmental scale along one or more intellectual dimensions onto which judges may map a student. One developmental model is Perry's work on the intellectual and moral development of college students (Perry, 1970). Perry traces the development of college students' views of knowledge along a continuum of dualism—relativism—commitment. Perry's model is interesting both in methodology and content.

First, Perry's work is an excellent example of the validation or verification process used by descriptive research. Secondly, Perry and his colleagues observed that the impetus that moved students along the continuum from dualism to relativisim to commitment was not so much the formal college experience; i.e., the coursework: it was rather the interaction, especially discussion, with their fellow students with diverse backgrounds and divergent viewpoints (Perry, 1970). This is consistent with Vygotsky's view of the facilitating effect of collaborative learning (Vygotsky, 1978).

Perry draws no specific instructional prescriptions from his model.

The second developmental model which has received extensive attention in the literature of science teaching is the work of Piaget on the growth of logical thought. Science educators believe that a large majority of the science concepts taught at the secondary and college levels require formal thinking. However, their research indicates that large numbers of adolescents do not appear to be at the formal level of intellectual development. One review of the literature (Chiappetta, 1976) estimates that number to be 85%. Research done specifically with college freshmen reports from 25% to 40% reasoning at the formal level (Killian, 1979).

Much of this work may be criticized on methodological issues, if not theoretical ones, but it is extensive and consistent enough to convince science educators to develop instructional models and techniques based on its conclusions and the assumption that operations of the formal stage can be taught, and/or that transition from the concrete to formal reasoning can be fostered.

DeCarcer, Gable, and Staver (1978) review a number of studies that seem to provide evidence that operations of the formal stage (i.e., controlling variables, proportional reasoning, etc.) can be taught if students have the necessary maturation level. There is not much evidence, however, for maintenance, generalization, or transfer of training.

Two common factors that appear in successful training studies attempting to promote transition from concrete to formal thought are physical manipulation and peer interaction (Ward & Herron, 1980). One teaching approach utilizing these factors is Karplus' Learning Cycles Model. It is a three stage model: Exploration, Concept Introduction, Concept Application. Students work together as they advance through the stages, manipulating the material and devising a system for organizing it (Karplus, 1974). Treatment studies using the Learning Cycles Model have shown positive results when the treatment is extended to at least a semester (Ward & Herron, 1980).

It isn't surprising that science educators have been so enthusiastic about Piagetian theory and its applications since most of the task Piaget used were logio-scientific. There is some question, though, as to the reasonableness and practicality of such a direct application of Piagetian theory to education. Briggs (1980) cites research that shows that the responses of college students on a variety of tasks in physics and other disciplines may jump from concrete to formal or drop from formal to concrete, in a simple test-retest situation. Further, changing the way a question was asked, increasing response time, providing strong motivation, or providing specific instruction in content can dramatically affect the level of responses.

Biggs argues that the Piagetian stages refer to *personalogical* characteristics while educators are concerned with *response* characteristics. He suggests that we must distinguish between the developmental base level from which a student is operating and the structure of the outcome of his learning a particular content task. In his opinion, educators can do virtually nothing about the first. They can influence some determinates of the latter (Biggs, 1980).

In fairness to cognitive process instruction investigators, they are obviously more concerned with learning outcomes that with the hypothetical cognitive structure, although some of them tend to cite the data about Piagetian levels as a way of demonstrating the need to instruct differently.

The Micro-Analytic Framework

Those who work with the micro-analytic frameworks are good examples of the focus on learning outcomes. The micro-analytic framework provides a way of modeling cognitive structure. Micro-analytic models specify the manner in which knowledge is organized, the causal mechanisms responsible for processing that knowledge, and the mechanism by which the structure evolves in time. In this group, we can include Larkin's qualitative models of an expert and a novice solving

standard physics textbook problems (Larkin, 1976). Another example is Clement's analysis (1979) of a beginning student's conception of momentum and force.

Clement's purpose was to evaluate the student's knowledge structure and reasoning processes relevant to causal conception in mechanics in order to take common preconceptions and misconceptions into account during instruction. Clement recorded the student's thinking aloud as he worked on the problem, and then this protocol was analyzed to produce a map of the conceptions that underlie the student's responses. The student did not come up with the "correct" answer, but Clements was able to analyze the student's level of concept development, his ability to identify and manipulate variables, his use of analogies and quantitative functions, and other reasoning processes. From the protocol analysis of this student and other beginnign physics students, Clements began to derive a list of common preconceptions that could prove a valuable aid to teachers (Clements, 1979).

Lochhead (1979b) uses a microanalytic approach in a paper which consists primarily of the dialogue between two beginning physics students as they solve the problem of determining a mathematical equation that describes the equilibrium state of a balance beam. The striking characteristic of the dialogue is repetition—as the students repeat and rephrase each other's statements and as they oscillate between understanding and confusion. Lochhead explains these oscillations as being "associated with the learner's need to construct multiple representations of new knowlege and test these representation against each other" (Lochhead, 1979b, p. 149). As the students view the problem with increasing sophistication, their descriptions become more precise. The students themselves detect and correct inappropriate uses of terminology spontaneously once they discover the need. Lochhead observes that: "the correct use of terminology is a natural consequence of understanding, but understanding does not result from skill in the correct use of terminology" (Lochhead, 1979b, p. 177). In summary, Lochhead sees meaningful learning as a slow and repetitive process which can be hindered with too much intrusion by the teacher. Instead teachers need to be able to distinguish superficial knowledge from well-developed conceptions and design tasks that force students to recognize where their knowledge is incomplete (Lochhead, 1979b).

The Diagnostic Framework

Both developmental and most micro-analytic models deal with behavior over time. They are, in essence, *movies* of the subject. Models in the diagnostic framework might better be compared to snapshots of a subject's behavior. They provide descriptors which are used to diagnose behavior of a particular subject in a given situation. Perhaps, for this reason, they seem to be used less frequently by cognitive proeess instruction researchers. The classic examples that are drawn upon by the field are Bloom and Broder's (1950) study of the problem-solving behavior of college students and Polya's (1973) work on mathematical heuristics.

Finally, let's look at what cognitive process instruction proponents have written about instruction and at several instructional models that have been evolved.

The Instructional Framework

di Sessa (1979) calls for a program of research and development for education material, especially in physics and mathematics, which will both "do justice to the powerful logical structure of the subject, but at the same time mesh properly with the cognitive reality of human beings" (di Sessa, 1979, p. 239). She uses the computational metaphor to emphasize the difference between *material* knowledge (directed externally on physical events or abstract relationships) and *control* knowledge (directed internally toward personal functioning and thinking itself). She points out that the way an expert uses a concept; i.e., the control structure, is as much a part of his understanding as tbe formal structure of the idea, in much the same way that the control structure of a computer program makes a significant difference in its functioning. Further, process itself can be an effective knowledge carrier.

di Sessa warns against the overuse of the logical formalist metaphor in education—that is, the overuse of axiomatics and the assumption that science is deductive. She calls for a curriculum that takes into account intuition, control knowledge, and experiential support. Thus she recommends that pedagogical material— (1) provide a discovery-rich environment; (2) discuss and develop "higher-level" organization skills; i.e., control knowledge; and (3) be active and constructive rather than perscriptive or descriptive with process as its large scale unifying form (di Sessa, 1979).

D'Amour (1979), on the other hand, takes to task the inductive view of the scientific method as a model for science teaching because it reduces the student to the passive role of merely observing and making the "correct" inferences, and because it assumes that observations can be made independent of theory. Citing Karl Popper's critical fallibilist view, he concludes that the best approach for the scientist and the science student is by initiating a hypothesis and seeking evidence of its untruth. In such a situation what the student comes to accept as scientific knowledge rests on his own effort to disprove it. Science teaching methods must involve the student in actively reflecting on his own thought process while seeking to learn, and hypothesis generation and critical testing. D'Amour says that traditional lab activities are as educationally faulty as the lecture method because the emphasis is on adhering to an ideal model and finding the right answer.

D'Amour recommends the Guided Design methodology developed by Wales and Stager (1978). In the Guided Design, students are presented with an ascending order of well-designed, open-ended problems which they work through in small groups. Critical features of Guided Design are the instructional/feedback pages with leading questions, the group discussion, and the role of the instructor as model/consultant. Solutions to the problems require familiarity with a subject matter unit which is read independently outside of class as part of the background information. "Expert" answers to each question are provided as additional informed opinion, not as the "right answer." This approach helps students shift from seeing knowledge as acquisition of facts to an understanding that useful knowledge is the result of certain thoughtful modes of activity.

Finally, Whimbey and Lochhead (1980) have devised a program for teaching analytic reasoning that has been demonstrated to have positive effects on the math, science, and reading comprehension scores of disadvantaged college students (Whimbey, 1979; Whimbey, et al, 1980). It is an adaptation of Bloom and Broder's method which explicitly presents and teaches the characteristics of good problem solvers. A key to its effectiveness appears to be the method of "loud thinking"—students are forced to verbalize their thoughts, and bad habits, like jumping to conclusions, or misinterpretations or omission of important steps or information become vividly apparent. Students work in pairs, thinking aloud and monitoring one another's processes, as they solve progressively more difficult problems.

REFERENCES

Biggs, J. B. Developmental processes and learning outcomes in Kirby, J. R. and Biggs, J. B. (Eds.). *Cognition, Development, and Instruction.* New York: Academic Press, 1980.

Blau, S. D. Literary as a form of courage. *Journal of Reading,* 1981. 25:2, pp. 101-105.

Bloom, B. and Broder, L. *Problem Solving Processes of College Students.* Chicago, Ill. University of Chicago, 1950.

Chinppetta, E. L. A review of Piagetian studies relevant to science instruction at the secondary and college level. *Science Education*, 1976, 60(2), pp. 253-261.

Clement, J. J. Mapping a student's causal conceptions from a problem-solving protocol. In Lochhead, J. & Clement, J. (Eds.). *Cognitive Process Instruction*. Philadelphia: The Franklin Institute Press, 1979.

DeCarcer, J. A. Gabel, D. L. and Staver, J. R. Implications of Piagetian research for high school science teaching: a review of the literture. *Science Education*, 1978, 64(4), pp. 571-583.

D'Amour, G. Problem-solving strategies and the epistemology of science. In Lochhead, J. & Clement, J. (Eds.). *Cognitive Process Instruction*. Philadelphia: The Franklin Institute Press, 1979.

di Sessa, A. A. On learnable representations of knowledge: a meaning for the computational metaphor. In Lochhead, J. & Clement, J. (Eds.). *Cognitive Process Instruction*. Philadelphia: The Franklin Institute Press, 1979.

Karplus, R. *The science curriculum improvement study*. Berkely, CA: University of California, 1974.

Kavale, K. & Schreiner, R. The reading processes of above average and average readers: a comparison in the use of reasoning strategies in responding to standardized comprehension measures. *Reading Research Quarterly*, 1979, 14:1, pp. 102-128.

Killen, C. R. Cognitive development of college freshmen. *Journal of Research in Science Teaching*, 1979, 16(4), pp. 347-350.

Lin, H. Approaches to clincial research in cognitive process instruction. In Lochhead, J. & Clement, J. (Eds.). *Cognitive process instruction*. Philadelphia: The Franklin Institute Press, 1979.

Larkin, J. Cognitive structures and problem-solving ability. (SESAME working paper). University of California, 1976.

Lochhead, J. An introduction to cognitive process instruction. In Lochhead, J. & Clement, J. (Eds.) *Cognitive process instruction*. Philadelphia: The Franklin Institute Press, 1979.

Lochhead, J. On learning to balance perceptions by conceptions: a dialogue between two science students. In Lochhead, J. & Clement, J. (Eds.). *Cognitive process instruction*. Philadelphia: The Franklin Institute Press, 1979.

Perry, W. J. Jr. *Forms of intellectual and ethical development in college years*. New York: Holt, Rinehart and Winston, Inc., 1970.

Polya, G. *How to solve it*. New York: Doubleday & Co., Inc., 1973.

Vygotsky, L. S. *Mind in society: the development of higher psychological processes*. (Edited by Cole, M., John-Steiner, V., Scribner, S., and Sulemann, E.). Cambridge: Harvard University Press, 1978.

Vygotsky, L. S. *Thought and language*. Cambridge: The M.I.T. Press, 1962.

Wales, C. E. & Stager, R. A. *The guided design approach*. Englewood Cliff, N.J.: Educational Technology Publications, 1978.

Ward, C. R. and Herron J. D. Helping students understand formal chemical concepts. *Journal of Research in Science*, 1980, 17:5, pp. 387-400.

Whimbey, A. Teaching analytical reasoning in mathematics. In Lochhead, J. and Clement, J. (Eds.). *Cognitive process instruction*. Philadelphia: The Franklin Institute Press, 1979.

Whimbey, A., et al. Teaching critical reading and analytical reasoning in Project SOAR. *Journal of Reading*, 1980, 24:1, pp. 5-10.

Whimbey, A. and Lochhead, J. *Problem-solving and comprehension: a short course in analytic reasoning, 2nd edition*. Philadelphia: The Franklin Institute Press, 1980.

AN INFORMATION PROCESSING TRIBUNAL (IPT) FOR ADJUDICATING COMPLEX ISSUES IN EDUCATION . . . AND PUBLIC POLICY

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"That Irksome, Boring, Vital, Rewarding Experience" is the way *Time* magazine (September 28, 1981) introduced a feature story called "We, the Jury."

A system for hearing and adjudicating the complex issues of education is so clearly of benefit to all aspects of subsequent decision making that the lack of existence of such a system can only be attributed to a shared intuitive feeling that it would be "irksome", or worse. The term 'Information Processing Tribunal' (IPT) is offered here as a tentative code name for discussing a proposal to formulate such a system despite the lack of apparent enthusiasm to do so.

Discussed below are some of the possible features and a rationale for evolving an IPT system. A straw vote of the members of the American Reading Forum will aid the Board in its final vote to sanction or disallow the following proposal:

> It is proposed that a committee be appointed to select, and develop the particulars of, and IPT system, and to undertake one or more complete runs on it, and at the end of not more than two years, to recommend either non-adoption or adoption of an appropriate version of it by the American Reading Forum as part of its annual meeting.

Tentative IPT System

The particular system developed below is designed to be the most expedious possible given the nature of the organization and the time and space which separate its members.

Features:

1. A 'Critical Issues' committee of five ARF members, three of whom should be Board members or designates, first would select the issue to be adjudicated at the following year's conference. The issue to be adjudicated would not require further Board approval unless opposed by a majority of the Board members of the committee. It Board action was required to select an issue, those Board members serving on the committee would be expected to abstain from voting on the issue.

2. Next, the Critical Issues Committee would select, from members expressing a willingness to serve, or so failing, empounded by colleagual arm twisting, a tribunal of three persons to serve both as judge and jury in a "Critical Issue" hearing.

Those so appointed would be required to hold these minimum standards: a rank of assicate professor, or some non-academic equivalent, and a record of publication in refereed journals. The person appointed by the committee to preside over the hearing would be required additionally to hold an academic rank of full professor, or some such equivalent.

For the sake of continuity and other such expediencies, the tribunal probably should include at least one, though not more than two members of the Critical Issues Committee.

3. Next the Critical Issues Committee would tentatively select and/or solicit persons to represent opposing views.

Final notification of the particular wording of the issue, of the views represented, and of the persons appointed to represent those views would require the approval of the majority of the jduges agreeing to conduct the hearing.

4. The actual hearing would be held at the annual conference of the American Reading Forum.

The number and duration of the hearing session would be determined by the judges.

Judges would be expected to announce a tentative conclusion before the close of the conference. Within 45 days of the hearing(s), the judges would submit a written majority, and if necessary minority, opinion.

5. Opinions would be published in the conference proceedings, exempted from veto by consulting editors, though subject to their examination and recommendations.

6. The final paper would be published as the opinion of the judges. Endorsements of an opinion by the ARF would require a separate motion, probably at the next formal business meeting, or by a mail ballot conducted by an impartial member appointed to do so.

7. Briefs, which ideally would be filed prior to the actual hearing, could be submitted separately as conference papers and would be subject to the usual course of review.

8. Two persons would be assigned to record and monitor, as nearly as is tenable, the 'actual' proceedings.

9. Immediately following the concluding remarks of the advocates, the judges should allow a minimum of 30 minutes for members attending the hearings to raise questions, make comments, and announce or actually file separate briefs with the tribunal.

Rationals for an IPT System

It now is widely recognized that most issues are more complex than the information at hand for dealing with these. Accordingly, "knowledge industries" now account for over 40% of the Gross National Product. Even where the raw information is available, there is a recognized need for assistance in processing that information, preferably in the form of the considered opinions of authoritative, though unbiased, sources. The popularity of financial newsletters and news analysis magazines attests to this growing fact.

The judiciary system is the least politicized and most respected method for accumulating and processing information on complex issues in civilized societies. In many cases, the evolutionary stage of a nation can be inferred from the size of its knowledge industries and the fairness of the system which it employs to arbitrate differences.

Information Processing Tribunals (IPT's) would be a new addition to the knowledge industry. The IPT would be built upon the judiciary system and designed also to provide a forum for rational change. Without some appropriate place to express alternate views, movements for change tend to become frustrated and grind to a halt, or fall into the hands of persons with radical personal needs. Such circumstances tend to lead either to apathy and/or to a counterpurge mentality.

From other situations we can infer that the need for someone, or something, to guide decision making is so great a felt need that super-authorities are created. These persons usually are avuncular individuals who, without challenge, come to have an influence upon a field far out of proportion to any knowledge base which anyone could hold.

The judiciary system of the United States seems to offer more than one useful model from which academics might evolve a forum from which to educate, arbitrate and/or sanction change. Without pretense of knowing the judicial system intimately, it appears that there are at least these functions within it which can be selected or modified to meet varied demands and issues. There are "discovery" proceedings, for example, which could be held merely to hear facts and clarify issue(s). There are "equity" or "advocacy" proceedings designed to hear arguments on behalf of a position which some may believe to deserve more attention than it might be receiving. And, of course, there are "adversary" hearings where a position stands "accused", and a case is offered against it.

It could take some time to evolve an anlog to this legal system which suits the needs and character of the academic community. The effort to do so, however, seems worthwhile since the core of the judiciary system contains features which our current amorphous research and writing schemes do not provide.

There is no place, for example, in the U.S. to bring new curriculum ideas. It is naive to think that these can be promoted on a cell-by-cell basis in the schools or through journals. The latter typically have long periods to elapse between writing and publication, limited and confining space and form requirements, and low circulation.

An Information Processing Tribunal could provide the last, though not the final, word on the issues brought before it. This could be an exercise with far-reaching implications. Written opinions, for example, begin to correct for a great weakness in institutional, or bureaucratic organization: the absence of a memory, and therefore of wisdom.

Even in the most enlightened bureau, or decision making body, records only are kept of the decisions made and rules enacted, but no bureau keeps careful records of the reasons and conditions which entered into its decisions. Thus, while the circumstances surrounding a decision or policy may change, the policy often remains the same, creating massive disharmonies between purpose and practice. A record of each decision along with notation of the opinions and rationale for that policy would ameliorate many such inconsistencies.

In short, an Information Processing Tribunal could be of considerable assistance in providing an unbiased summary of facts with an accompanying authoritative, though non-authoritarian, opinion on such matters. These could serve as benchmarks for decision makers at all levels and in varied circumstances.

The potential benefits of such benchmarks take on international proportions when consideration is given to the world of nations, many of whom may need such information though they have not the resources nor the technology to acquire and/or process it.

Development of an IPT System in Reading Education: Responsibility and Benefits

As Americans we abhor dictates and central planning, though we have come to recognize too that there are certain problems with unbridled free enterprize. The displacements, disconcertion, and dismay which both central planning and free enterprize can create must be at a high pitch nationwide judging from the increasing number of persons seeking equity in the courts.

IPT is a bit of the hair of the dog that's biting us. It offers the possibility of stemming the tide of litigants seeking redress in overcrowded courts, courts which probably would prefer to defer many such cases to a collegual system of review, or at the least, to have a set of guidelines from such a system for assessing and redressing possible inequities.

Ironically, the need for such a system is *not* so great in our field, which might be the reason that we are able to seriously consider a proposal to be more efficient and effective. Reading Education, undoubtedly, is the most highly sophisticated field in all social science. We have the technology to teach anyone to read. Nonetheless, we sometimes can be quite insecure, permitting confounding influences to send us on seemingly avoidable and costly excursions away from the further honing and refining of this superior technology.

In this regard, I always think of the disproportionately large (or at least so it seemed to me) part which Ernie Rothkorf's theory of "mathemagenics" played for over ten years in studies of reading comprehension and text processing. Reading beavhior, in his own words, was merely the vehicle he employed to study something else. The research questions which he raised would have been quite different had the orientation of those studies been school learning and teaching.

There probably is a "natural" selection process which eventually causes the most appropriate ideas and findings to survive. But the process is fortuitous and can take generations. In this vein, consider as another example the issue of model building in reading. With very few exceptions, this aspect of the field has been dominated by non-reading people. Current models fill several volumes and are treated in many courses though it appears that they contribute absolutely nothing to our mission and purpose. The reason for this, I suspect, is that model building has become identified with the "reading process" and with discourse, or language, analysis. These are interesting, though tangential areas of study. These areas address primarily to questions of an epistemological or linguistic nature. The field of reading is not so much in need of models of the "reading process" per se, but of the "teaching-learning process." The teaching-learning process addresses to students and to

instructional outcomes and must contain attention to the role of the teacher (or teaching device), the temperament and abilities of the student, and to related factors such as social-emotional development and cultural opportunity. These elements are hardly to be found in most current "process" models.

It appears that if current models could be taken to a "court of equity" that, at the least, the intimidating effect which these have had upon reading-learning specialists might be broken. In due course we probably could expect to see reading specialists, again, building and employing appropriate models in their work.

A "court of equity", while always at risk of being politicized, or dampening of spirit, on balance, could be invigorating to the extent of providing high level inservice education for professors. The hearings could provide a platform for ideas which any one of us might not have been educated in or otherwise are unable to accommodate in terms of understanding its purported significance.

By way of a small personal example of this, I have not been able to grasp the significance of those things called "psycholinguistics" and the related points attributed to its proponents. Thus I cannot teach these effectively, nor formulate an intelligent position on them. Reading the literature available does not seem to help either; it does not seem to answer the comments and questions which I would like to pose. Thus, while not able to speak intelligently for or against such, and being a bit too ego-defensive to be a judge of this school of thought, I probably could benefit considerably from attending or reading the proceedings in which the opinions of my colleagues would be available to enrich my meager understanding.

Benefits to ARF

There are several possible benefits to the American Reading Forum in founding an Information Processing Tribunal system. Briefly, the most noteworthy are the following: 1. the crisp debate of critical issues in reading would be harmonious with ARF's name and purpose; 2. the organization, its conference and proceedings would enjoy a feature distinguishing it from other similar organizations; 3. the complete conference proceedings would enjoy the benefits of much wider dissemination if the published accounts of the "tribunal" prove useful to educators and other public policy decision makers; and 4. such popularity could result in greater income and set up the possibility of attracting support from foundations and individuals who may wish to endorse and perpetuate such actions among "learned" societies.

It appears, in conclusion, that an Information Processing Tribunal system could be of considerable value to decision makers, to researchers, to professors, to teachers, to our field, and to our organization. This prospect rests, however, upon whether we can live with the irksome, awsome role aptly summed up in the expression "We, the Jury"(?).

LITERATURE, INSTRUCTIONAL MATERIALS, AND TEACHER PERCEPTIONS OF THE DEVELOPMENT OF COMPREHENSION SKILLS: A RESEARCH REPORT

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Over the nation, basal readers are widely used as an important part of developmental reading instruction in the overwhelming majority of classrooms through grade six—and, to a lesser extent, in grades seven and eight. It is estimated that 80 to 90 percent of elementary school classrooms use basal reader series in some form (Aukerman, 1981).

Starting at second grade level—if not earlier—most of the selections in the pupil texts are excerpts or adaptations from children's books or periodicals. The teacher's manual suggests an instructional program in which *initial* instruction in the development of most skills is based upon selections in the pupils' texts.

The selections in the pupils' texts include a variety of types of literature—and often are selections written by well-known and talented writers of children's books. But no basal text was ever intended to be a total reading program. Teachers are encouraged to use selections in basals as springboards for further reading. An excerpt from E. B. White's *Charlotte's Web* is a clue for the teacher to have several copies of the book available at the completion of instruction involving the excerpt. Consequently, teachers are generally expected to maintain a current awareness of children's literature and to incorporate an emphasis on library books to reinforce skills, understandings, and appreciations that have previously been taught.

The purpose of this investigation was: 1) to determine instructional staff perceptions of comprehension skill development, 2) to analyze the comprehension skill development of selected elementary school basal reading materials, and 3) to analyze and recommend children's literature selections and teaching strategies to support skill development in comprehension.

In an effort to accomplish the first of these objectives, the following 12-point rating scale was employed.

RATING SCALE: USING CHILDREN'S BOOKS TO ENHANCE COMPREHENSION AND ENJOYMENT
(Ira E. Aaron, University of Georgia)

Directions: The practices listed below are often recommended as guides when using children's literature in enhancing comprehension and enjoyment. Though basal readers depend heavily upon children's literature as the vehicle for teaching reading skills, the emphasis here is on using library books for children to reinforce some skill/understanding that has previously been taught and to encourage students to read for enjoyment. Indicate by drawing a line around the appropriate number the extent to which the practice is being following in your class (or classes). Use the following scale:

1—Almost always	4—Seldom or never
2—Most of the time	5—Undecided
3—Sometimes	6—Not applicable

1. Decoding and comprehension skills are taught systematically to students in order to assure that they can read for understanding, enjoyment and appreciation. 1 2 3 4 5 6
2. Skills that cannot be taught (or taught well) through use of children's literature are developed in other ways. 1 2 3 4 5 6
3. The teacher keeps in mind that often the only purpose for reading children's literature is for enjoyment and appreciation. 1 2 3 4 5 6
4. The teacher avoids asking too many questions about a book children have read (or have had read to them), recognizing that overanalysis of a selection can interfere with enjoyment and appreciation. 1 2 3 4 5 6
5. The teacher emphasizes enjoyment and appreciation when poetry is used in instruction. 1 2 3 4 5 6
6. The teacher reads regularly to students. 1 2 3 4 5 6
7. A wide variety of recreational/informational books on a wide range of reading levels is accessible to students. 1 2 3 4 5 6
8. The daily/weekly schedule includes time reserved for students to read on their own, without too much teacher supervision. 1 2 3 4 5 6
9. Students often share what they read, and time for sharing is provided in the school day/week. 1 2 3 4 5 6
10. The teacher keeps up-to-date on new children's books and other reading materials. 1 2 3 4 5 6
11. The teacher and the school librarian maintain a good working relationship that fosters improved reading instruction through use of children's literature. 1 2 3 4 5 6
12. The teacher enjoys reading and that enjoyment is obvious to students. 1 2 3 4 5 6

These 12 practices are often recommended as guides for using children's literature in enhancing comprehension and enjoyment. Although statements on the rating scale were not taken directly from any source, elements of all except item 2 are supported by current reading methodology texts (Harris and Sipay, 1980; Smith and Robinson, 1980; Burns and Roe, 1980; Kennedy, 1981; Olson and Dillner, 1982). Based on teaching experience and elementary school staff development, item 2 was added in order to assess teacher perceptions of the feasibility of the use of literature and its alternatives for teaching comprehension skills.

The rating scale was administered to 27 inservice teachers, 26 preservice teachers and 28 paraprofessionals—all of whom were currently assigned to elementary classrooms in grades kindergarten through six. The results are reported in Table 1.

TABLE 1
RESPONSES OF INSERVICE TEACHERS, PRESERVICE TEACHERS, AND PARAPROFESSIONALS TO RATING SCALE ON USE OF CHILDREN'S LITERATURE IN TEACHING COMPREHENSION, IN PERCENTAGES

Items*	Inservice Teachers	Preservice Teachers	Paraprofessionals	Inservice Teachers	Preservice Teachers	Paraprofessionals	Inservice Teachers	Preservice Teachers	Paraprofessionals
	1 and 2**			3 and 4**			5 and 6**		
1	78	57	61	22	31	0	0	12	39
2	70	61	43	19	27	18	11	12	39
3	78	58	43	22	27	22	0	15	35
4	63	46	32	33	19	18	4	35	50
5	52	35	39	29	23	25	19	42	36
6	89	50	50	11	38	22	0	12	28
7	89	81	43	11	19	7	0	0	50
8	74	61	36	26	27	32	0	12	32
9	37	46	25	60	31	29	3	23	46
10	44	38	25	56	31	36	0	31	39
11	78	50	29	18	15	32	4	35	39
12	85	50	61	15	27	7	0	23	32
	N= 27	N= 26	N= 28	N= 27	N= 26	N= 28	N= 27	N= 26	N= 28

*Items 1-12 in Rating Scale: Using Children's Books to Enhance Comprehension and Appreciation/Enjoyment.

**Responses 1 (almost always) and 2 (most of the time) were combined. Responses 3 (sometimes) and 4 (seldom or never) were combined. Responses 5 (undecided) and 6 (not applicable) were combined for ease of reporting and interpretation.

The discrepancy between perceptions of staff members is apparent in the percentage responses related in Table 1. Item 9 (opportunity for students to share what they read) and item 10 (teacher awareness or currency in children's reading material) were given positive ratings by less than 50 percent of all respondents. The responses to item 10 are consistent with previous research which states that teachers do not maintain up-to-date awareness of children's literature (Russell, 1949; Carter, 1976; Wendelin, Zinck and Carter, 1981). Item 5 (enjoyment and emphasis on poetry in instruction) received the next lowest number of positive responses.

By comparison to these negative perceptions, only three items were given positive ratings by 50 percent or more of the respondents. These were item 1 (systematic teaching of decoding and comprehension skills), item 6 (regular reading *to* students by teachers) and item 12 (teacher enjoyment of reading). Inservice teachers consistently expressed a more positive perception of their own performance than did preservice teachers or paraprofessionals as they observed teacher performance.

The analysis of comprehension skill development as presented in selected elementary school basals was the second objective in this investigation. A large number of basal reading series at varied grade levels were reviewed. Basal series' currency and use were the factors which determined selection. Only basal reading series published between 1975 and 1981 were included. Sales reports (Sigel, 1981; Hjalmarson, 1981) and the estimated number of school system adoptions (interviews with basal reading text publishers' representatives; Aukerman, 1981) were used to determine five of the most widely used series from the longer list of current series.

Using the scope and sequence charts prepared by these five basal reading series, the time of introduction and testing of comprehension skill development was determined. The skills sampled were those often included in the categories: relaionships, characterization, story problem/solution and critical reading as well as main idea, predicting outcomes and drawing conclusions.

TABLE 2
LEVELS AT WHICH SELECTED COMPREHENSION SKILLS ARE FIRST INTRODUCED AND TESTED IN FIVE WIDELY USED BASAL READING SERIES

Skills	Series 1		Series 2		Series 3		Series 4		Series 5	
	I*	T*	I*	T*	I*	T*	I*	T*	I*	T*
Relationships										
class	PP				PP		PP		K	R
opposites	2/1	2/1			PP				K	P
sequence	PP	PP	PP	PP	PP		P	P	K	R
cause/effect	F	F	PP	F	PP		F	F	P	F
place	4		3/1		3/2		K	—	P	2/2
time	4		F	3/2	3/2		K	—	F	3/2
analogous	F	F	2/1	—	3/2		—	—	3/2	3/2
Characterization	F	2/2	PP		3/2		P	P	1/2	2/1
Story Problem/Solution	PP		P		4				1/2	2/1
Main Idea	PP	PP	PP	PP	PP		PP	PP	F	F
Predicting Outcomes	PP	P	PP	F	PP		F	F		
Drawing Conclusions	PP		PP	PP	PP		F	F	2/2	2/2
Critical Reading										
making judgments			2/1	3/1	PP				P	2/1
distinguishing genre	F		F		3/2		3/1	3/1	4	4
folk tale	F		F		3/2				4	4
historical fiction	3/2		4		4				5	5
fantasy/fact	P	P	F				2/2	2/2	2/1	2/1
Reference/Source										
location	4		4	5	4		2/1		5	5
Author										
expertise										
purpose			3/2	3/2	4		2/1		5	
bias/opinion	4								5	5
Evaluation of Character actions	2/2	2/2				2/2	2/2	2/2	3/1	3/1
Fact vs. Opinion			3/1	3/1	5		4	4		

*I = Introduced *T = Tested

The grade level at which selected skills are introduced and tested varies from series to series as shown in Table 2. There is variation also in the labels which are given to specific skill one development. For example, one series may label an activity as "predicting outcomes" while others will categorize similar pupil material under the broad label of drawing conclusions. The grade level at which skills are introduced are sometimes dramatically different from one series to another. As families and school children move about the country from one school system to another and often from one basal reading series to another, it is apparent that developmental sequencing of instruction may be difficult.

Specificity in scope and sequence charts vary from publisher to publisher. In selecting instructional materials, a teacher must look carefully at the components of a program as well as the author and/or publisher's interpretation of the program in a scope and sequence chart.

An emphasis on comparison of published materials, (labels, levels of skill introduction and testing, levels of reinforcement or maintenance of skills) should direct attention to the philosophy or basis upon which such decisions are made. Such an analysis strengthens the construction and the selection of materials.

The third objective in this project focused on children's literature selections as a part of skill development in comprehension. Based on the reading of contemporary children's books, a number of titles were selected to demonstrate how specific books might be used to develop comprehension skills that have previously been introduced. These are categorized under four skill headings.

TABLE 3

SKILL DEVELOPMENT THROUGH USE OF CHILDREN'S LITERATURE: SOME SAMPLES

Relationships

1. Study the pictures in *Noah's Ark*. Is the story set in modern times or a long time ago? How can you tell? Identify as many pairs of wild animals as you can. Do the same for farm animals. (Illustrated by Peter Spier. Doubleday, 1977.)
2. Why did the Herdman children go to the meeting where parts for the Christmas Pageant were being assigned? (Barbara Robinson, *The Best Christmas Pageant Ever*. Harper and Row, 1972.)
3. In Doris Buchanan Smith's *Last Was Lloyd*, why did Lloyd want his classmates to think he could not hit a ball? (Viking, 1981.)

Characterization (Traits/Actions/Feelings)

4. How did Ramona feel about her mother's relationship with her and her sister Beezus? Do you think she was justified in her beliefs? Why or why not? (Beverly Cleary, *Ramona and Her Mother*. William Morrow, 1979.) Compare Ramona's feelings toward her father in *Ramona and Her Father* (William Morrow, 1977) with those she had for him in *Ramona and Her Mother*.
5. In *Ramona Quimby, Age 8*, Ramona now is a "big girl." How does she now feel about her mother? her father? "Yard Ape"? Beezus? Mrs. Whaley? Willa Jean? *(Ramona Quimby, Age 8*. William Morrow, 1981.)
6. In Betsy Byars' *The Cybil War*, which character do you like best—Simon, Cybil, or Tony? Why? Would you want a friend like Tony? Why or why not? (Viking, 1981.)
7. In Delores Beckman's *My Own Private Sky*, how did Arnold and the other children feel about Pilgrim? How did Pilgrim's age influence their feelings about him? (E. P. Dutton, 1980.) (International Reading Association Award.)

Story Problem/Solution

8. What was the story problem in Bill Peet's *Big Bad Bruce?* How was it solved? (Houghton Mifflin, 1977.)
9. What was the story problem in Madeleine L'Engle's *Dragons in the Water?* How was it solved? Was the solution a realistic one? Why do you answer as you do? (Farrar Straus Girous, 1976.)
10. In *Miss Nelson is Missing!*, what is the story problem? How was it solved? Could this story really have happened? Why or why not? (Harry Allard and James Marshall. Houghton Mifflin, 1977.)

Critical Reading

11. We have read three books of Maurice Sendak—*Where the Wild Things Are, In the Night Kitchen*, and *Outside Over There*. Some people say these are "scary" books. Do you think so? Why or why not? Which did you like best? Why? The illustrations in the three books are quite different. Which ones do you like best? Why? Could any one of these stories really happen? Why? (Harper and Row, 1963, 1970, 1981.)
12. In *Kevin's Grandma*, by Barbara Williams (writer) and Kay Chorao (illustrator), which boy—the narrator or Kevin—do you believe? Or do you believe both boys? Why? (E. P. Dutton, 1975.)
13. Is the setting in Lloyd Alexander's *Westmark* historically accurate, or is it fantasy? Explain your answer. (E. P. Dutton, 1981.)
14. Mrs. Bly, in Robert Newton Peck's *Justice Lion*, was an unusual person. Which of Mrs. Bly's traits did you like? Which did you dislike? Why? (Little, Brown, 1981.)

The samples listed illustrate what might be done where a book has been read by an individual or several children or the teacher has read a book—chapter by chapter over as many days as there are chapters—to the children.

Teachers and their instructional materials, particularly basal reading series, have received in the past and do presently receive considerable criticism. Such criticisms are not always based on careful analysis of current practices and materials. The criticism should not be eliminated. On the contrary criticism is vital to improvement in designing, selecting and using teaching strategies and materials. However, criticism *should* be based on careful evaluation. The current 1) study of teacher perceptions of practices, 2) analysis of reading materials and 3) suggestions for the use of materials is one effort in such an evaluation process.

REFERENCES

Aukerman, Robert C. *The basal reader approach to reading*. New York: John Wesley & Sons, 1981.

Burns, Paul C. and Roe, Betty D. *Teaching reading in today's elementary schools* (2nd Ed.). Chicago: Rand McNally College Publishing Co., 1980.

Carter, Sylvia, Interpreting interests and reading interests of pupil's in grades one through three. Unpublished doctoral dissertation of the University of Georgia, 1976.

Harris, Albert J. and Sipay, Edward R. *How to increase reading ability* (7th Edition). New York: Longman, Inc., 1980.

Hjalmarson, Gordon R. *SFN:* Annual report 1981. Glenview, Illinois: Scott, Foresman and Co., 1981.

Kennedy, Edward C. *Methods in teaching development reading* (2nd Ed.). Itasca, Illinois: F. E. Peacock Publishers, Inc., 1981.

Olson, Joanne P. and Dillner, Martha H. *Learning to teach reading in the elementary school* (2nd Ed.). New York: Macmillan Publishing Co., Inc., 1982.

Russell, David. Teachers' memories and opinions of children's literature. *Elementary English*, 1949, *26*, 475-482.

Sigel, Efrem (editor). The top el-hi publishers. *The New Educational Marketer*, 1981, *12*(23), 2.

Smith, Nila B. and Robinson, H. Alan. *Reading instruction for today's children* (2nd Ed.). Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1980.

Wendelin, Karla H., Zinck, R. Ann and Carter, Sylvia M. Teachers memories and opinions of children's books: A research update. *Language Arts*, 1981, *58*, 416-424.

READING IN THE DISCIPLINES: USING SPORTS TO STIMULATE CRITICAL THINKING

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Effective reading and thinking are congruent with affective stimulation. If what a person reads lacks emotional appeal, i.e., is unmeaningful or unmotivating, the residual effect will be short-lived and inconsequential.

One area that is provocative and has great meaning for many young people is sports. There is no question that athletes and athletics exert a major influence on people all over the world. Reggie Jackson, the renowned star of the California Angels, recently remarked:

> Fifty years ago it was Bogard and Cagney, Twenty-five years ago it was Elvis Presley and Chubby Checker. Now, it's the age of the athlete.

Teachers can make good use of the current passion for sports and sports figures by combining reading instruction in the disciplines with sports-related written material. This approach is especially effective in getting students to *become actively involved with what they read!*

One of the most disconcerting problems faced by teachers in the academic disciplines concerns, not so much students' inability to read, but their helplessness or resistance to thinking deeply about what they read and responding with some measure of critical intensity. These teachers claim most of their pupils can "bark" at print or call the words. However, they frequently fail to "come to grips" with an author's ideas and wrestle intellectually with the text. In the words of Hilda Taba, "they do not generate a 'cognitive commerce' with the printed page."

If one accepts the definition of reading as "thinking," or a medium for employing print as a stimulus to reasoning, and if one agrees that a person can only think about something to the extent that individual has a basis of knowledge or experience concerning it, then it is not surprising many students, given their lack of knowledge and experience in various subject fields, have great difficulty thinking about, understanding, and appreciating much of what they read in school.

Moreover, for critical reasoning to occur as a consequence of reading, the material itself must suit a person. The reader must be motivated and have a background of vicarious or real-life experiences which relate to the reading assignment. These serve as the building blocks which a person uses to interpret what is read and reconstruct or extend understanding. In the final analysis, comprehension and recall are by-products of concentration which is the outgrowth of an aroused interest on the reader's part. Bigge (1971) claimed:

> Content that is no so brilliantly structured, but still has much meaning, will be remembered in proportion to its meaning. Nonsense material is headed for extinction before the last syllable is uttered. (p. 290)

The unmeaningful interaction between many students and their textbooks and their failure to exchange ideas, opinions, or sentiments, with supplementary exposition, may account for why so many of them are quick to answer "It's boring," when asked why they do not like this or that subject. In essence, they are saying, what they have read does not speak personally to them and makes no sense to their lives. This may happen for two reasons:

1) Many students lack the language experiences to appreciate fully or understand what they are asked to read in school. Many teachers fail to consider these deficits. They ovrlook the need to use concrete examples as a means of introducing students to thoe facets of language (orthographic or vocabulary) with which they are unfamiliar.
2) Many students lack the vicarious or real-life experiences that allow them to read content based materials insightfully. Many teachers fail to relate new ideas, information, or learning experiences to students' lives by placing the aforementioned in a context with which they can identify and one through which they discover some personal meaning and value.

Sports happens to be one very meaningful context for a large number of students. These youngsters have developed a wealth of language as well as vicarious or real-life experiences in sports that teachers can use as a backdrop for further learning. The former have watched live sports contents and have seen them on television as well. They have listened to broadcasters, players, or performers describe the action or circumstances surrounding various games and events. In doing so they have acquired sophisticated vocabulary and concepts related to athletics.

Additionally, these students have accumulated a large store of facts and statistics concerning the history of sports, sports figures, rules, strategies, events, and teams. Many are stimulated to *apply* or *demonstrate* what they know and frequently they *want to learn more!*

Sports and reading instruction in the disciplines do hand-in-hand for several other reasons:

- Both sports and reading skills in the disciplines can promote independence, aggressiveness, assertiveness, ambitious desire for achievement, success, prestige or recognition, self-control and a sense of mastery.
- The two arens require sound coaching/teaching methods; good models; structured, consistent, and individualized guidance; continuous reinforcement; sequential acquisition of fundamental skills; plenty of practice; and a lifetime of development.
- The physical fitness boom has captivated men and women, young and old, able-bodied and handicapped alike. Because of this intense public interest in athletics, sports magazines, the sports sections of newspapers, biographies of sports heroes, publications containing sports quotes, superstitions, poetry, and humor can be used by teachers to accelerate students' reading skills in the disciplines. They can: (1) provide students with opportunities for vocabulary and language enrichment; (2) appeal to their interests and encourage them to become active readers instead of passive word callers; (3) give students opportunities to distinguish between fact and opinion; (4) provide chances to collect and organize data; (5) prompt students to locate likenesses and differences in their reading and urge them to criticize an author's ideas or evaluate them for strengths and weaknesses; (6) inspire students to do inductive as well as deductive thinking and stimulate interpretive or creative levels of assessment; and (7) expose students to various circumstances which require them to perform problem solving operations.

Suggested Activities

Teachers can employ sports-related reading materials to supplement curricula in various academic disciplines and motivate students to practice and apply reading/thinking skills at higher levels. The following types of activities are easily incorporated into the areas of English, math, social studies, health, and science. These examples are not meant to be whole instructional packages, but to serve as models from which classroom teachers might generate numerous other activities in their specific subject fields. They should not be employed as simply paper and pencil drills. A more acceptable approach would consist of using these ideas to stimulate group discussion and provide a context wherein students are encouraged to practice related reading or writing skills. Those teaching in lower grades can modify the language or format of these to suit their specific purposes.

Sports in English or language arts:

Using the following kinds of statements from newspapers or sports magazines, instructors can stimulate students' interest in vocabulary, language, math, and social studies while encouraging them to recognize simile or metaphor, perform deductive/inductive reasoning, and calculate solutions to arithmetic problems.

> Last year, neither Baylor nor Singleton could throw a baseball through a spider's web. Baylor's arm has always been considered as useful as adenoids.

Directions: Ask students to read the above statement and respond

to the following questions:

1. Why has the author used the image of a "spider's web" to describe Baylor's and Singleton's pitching? (Metaphor)
2. What does the statement, "As useful as adenoids" mean? (Simile)

True or false: Defend your answers!

1. Baylor has the better throwing arm.
2. Singleton's arm is much stronger than Baylor's.
3. Baylor and Singleton both pitch.
4. They both play baseball.

* The favorite sports of Bruce, Harvey, Ike, and Teresa are baseball, hiking, ice skating, and tennis.

Directions: Ask students to read the above statement and keeping in mind that no person's name begins with the same letter as his or her favorite sport respond to the following true/false statements:

1. Teresa and Harvey do not like team sports. (Explain)
2. Harvey and Bruce do not like cold-weather sports. (Explain)
3. What is each person's favorite sport?

* More and more ballplayers, you may have noticed, are to be seen digging handfuls of small things from their pants pockets, popping them into their mouths, executing complex masticatory maneuvers and spitting odd little flecks into the breeze.

Directions: Ask students to read the above statement and answer the following true/false questions:

1. The author is probably referring to football. (Defend your answer)
2. Masticatory maneuvers refers to jumping up and down. (Explain!)
3. The ballplayers are probably popping raisins into their mouths.
4. If you think the answer to number 3 is false, identify what the players are doing.

To teach sports poetry, have students read, for example, "To An Athlete Dying Young," by A. E. Housman, and answer the following questions:

1. What is the tone of Houseman's poem?
2. What sense do you get for an athlete's future?
3. Is there any value in having been a great athlete? Why or why not?
4. What is the author's advice to those who would so dedicate themselves?
5. Does the author leave you with a feeling that fame and glory are longlasting and highly prized?
6. Write a poem of your own expressing your feelings toward a sport or great athlete.

To get students interested in reading biography, introduce them to a brief episode taken from a book and used as an "interrupted" story. For example, an instructor might excerpt a couple of pages from *Jesse*, by Jesse Owens and Paul Neimark and copy these for the class. Try and choose a portion of the story that tells of a dramatic moment in the individual's life or a part that you think is sure to "hook" the group and stimulate real interest. After reading the selection and discussing it, make a couple of copies of the book available to students. Give the students a date and time to report to the class on some further events in the life of Jesse Owens.

To interest students in broadening their vocabularies and challenge them to make generalizations or inferences, ask them to look over the following list of clues that will provide them the necessary information to pick the National Football League team and match the correct city and corresponding mascot:

Clue	City	Mascot
Example—King of beasts	Detroit	Lions
1. Army insect	(New York)	(GI/ants)
2. 7 squared	(San Francisco)	(Forty-niners)
3. Bad news _____	(Chicago)	(Bears)
4. A 747	(New York)	(Jets)
5. Hostile attackers	(Oakland)	(Raiders)
6. Various iron workers	(Pittsburg)	(Steelers)
7. Suntanned bodies	(Cleveland)	(Browns)
8. IOU's	(Buffalo)	(Bills)
9. Help to relocate	(Green Bay)	(Packers)
10. Flipper's family	(Miami)	(Dolphins)

Sports in Math and Social Studies:

Have students read statements like the following and answer the questions:

* Last year Tony Dorsett ran for a total of 1,680 yards. Ron Springs ran for 1,120 yards. Robert Newhouse gained 890 yards rushing.

1. How many yards did Dorsett and Newhouse gain on the ground?
2. What is the total number of yards gained by all three runners?
3. What is the difference between the total yardage compiled by Springs and Newhouse? Between Dorsett and Springs? Between Newhouse and Dorsett?

The same three running backs caught passes totalling 650 yards for Dorsett, 598 yards for Springs, and 425 yards for Newhouse.

1. What is the total number of passing yards gained by the three players? Is it greater or less than the total rushing yardage?
2. What is the difference between the number of yards Springs was able to gain on the ground compared to those he gained through the air?
3. Why do you suppose the totals are much less for passing as opposed to rushing?

Have students read statements like the following and answer the accompanying questions.

*Davis was paid $225,000 for his first fight—$185,000 by CBS and $40,000 by promoters in the "Big Apple." He has three more fights on the same contract with CBS, each calling for $185,000.

1. What percentage of Davis's first fight was paid by CBS?
2. What is the difference between the percentage paid by the promoters and that paid by CBS?
3. How much does CBS pay Davis for all four fights?
4. What are Davis's total earnings for this contract?
5. In what city was the first fight held?

Sports in Health or Science:

The ability to keep records and read graphs, charts, and pictorial material is important in many content areas. Students must make assumptions, comparisons, inferences, and conclusions based on these diagrams. The following activity provides students with one such reading opportunity and requires them to record, collect, organize, and interpret data.

Provide students with stop watches. First, pair students for recording each others pulse rate at rest. Ask them to record these statistics on a chart. Discuss the differences among class members. Next, ask them to take turns running in place for two minutes and record these figures as well. How do the rates differ? Why did they increase? Finally, ask them to measure the heartbeat after a two-minute recovery period. How many returned to their original rates? Why are some about the same as they were at rest, while others are still somewhat accelerated?

As a follow-up activity, ask for volunteers to go on a jogging program for two weeks. At the end of that time, have the whole class repeat the experiment. Are there any differences between the volunteer joggers' figures and those of the rest of the students? Discuss reasons for these changes.

REFERENCES

Bigge, M. L. *Learning theories for teachers.* New York: Harper and Row, 1971, 290.

Hammel, R. Student-athletes: Tackling the problem. Phi Delta Kappan, September, 1980, 7-13.

Housman, A. E. To an athlete dying young. *A treasury of the familiar.* New York: The Macmillan Co., 1968, 361.

Owens, J. & Neimark, P. *A spiritual autobiography.* Plainfield, New Jersey: Logos International, 1978.

Robinson, F. P. *Effective study.* New York: Harper and Brothers, 1960.

Underwood, John. The writing is on the wall. *Sports Illustrated,* May 19, 1980, 37-72.

REACTION: USING SPORTS TO STIMULATE CRITICAL THINKING

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The Greeks believed you could not separate educating the mind and the body. While they emphasized physical games and contests and maintaining healthy bodies, they especially stressed reading and other forms of education. No doubt, if this ancient empire were confronted with educating today's youth to read, they would choose print related to the student's interests to promote critical thinking and reading skills. Gentile advocates the development of thinking and reading skills instruction in the respective content areas through the use of sports materials. The contention is to capitalize on the students' interests and actual experiences. Any teacher/administrator who has taught school is cognizant of the majority of students' interests in sports, physical education, and health classes. Using materials related to their interests is another way of working with their affective and cognitive strengths to alleviate weaknesses in the cognitive development of initial thinking and reading skills.

It is logical that when students read and think about material in which they are both knowledgeable and interested, they are more capable of operating at different levels of comprehension. Teaching and practice in the development of thinking and reading skills using such models as the Barrett and Bloom taxonomies in conjunction with high interest sports materials could very well carry over to advancing these skills in other content area disciplines.

Stauffer (1969) defined reading as a thinking process and Smith & Dechant (1961) define reading as experience brought to the printed page. These operational definitions of reading lend credence to the author's attempt to ameliorate the teaching of critical thinking and readig skills based on students' primary interest areas. From the psychological principles of learning we need to practice teaching the unknown based on the known. Therefore, as teachers we can develop students' higher intellectual thinking processes by having them interact with their peers and teachers on topics in which they are involved.

Issue could be taken with the author on one specific manner of how "sports and reading instruction in the disciplines go hand-in-hand . . .". It is interpreted by the reviewer that his list of comparisons are meant to be of a positive nature. Therefore, the term aggressiveness might be deleted in that his point on assertiveness should make the probable desired comparison.

Many of today's sports commentators are very articulate. A large number are former athlete/celebrities in the respective sports. The vast proportion of students interested in sports and famous athletes can identify, thereby accepting and emulating, the excellent language facilitation modeled by these television and radio announcers. Most of us learn by modeling after others. Students listening to the vocabulary and analytical abilities of these reporters can adapt their language and thinking skills in other disciplines.

The author has provided several suggested activities which teachers can easily implement in their own classrooms. Some of these include vocabulary (which is the root of reading comprehension and thinking) exercises. Another fringe benefit of using these suggested activities is the growth of the students' self image through having had these profitable vicarious experiences that can affect their social and academic efforts.

Gentile could very well have included with his recommendation of materials containing sports content, the suggestion of actually placing these materials in the classroom libraries for accessibility purposes. Additionally, mention might have been made of sustained silent free reading programs that could further enhance one's knowledge on a favorite topic while promoting the reading habit, vocabulary growth, and laying the background for what the author calls stimulating critical thinking and reading.

Not only can sports material profit and stimulate the students, but teachers who are aware of sports information and terminology find themselves better received by their students because of this common bond. Students accept teachers as more human and are likely to better appreciate their instructional expertise. This form of communication leads to a more conducive atmosphere for learning and instructional purposes.

In summary, this reviewer has observed that teachers either do not, or are not given the freedom to capitalize on students' reading interests by choosing commercial materials or an array of informally collected materials to be used for instructional purposes. Gentile provides good rationale for utilizing sports related materials and themes to build and stimulate critical thinking. One would find it difficult to argue against applying students' high-priority interests to the initial efforts of increasing or facilitating critical thinking and reading skills to be transferred to other disciplines.

REFERENCES

Smith, Henry P. & Dechant, Emerald V. *Psychology in Teaching Reading.* Englewood Cliffs, NJ: Prentice-Hall, Inc., 1961.

Stauffer, Russell, G. *Teaching Reading as a Thinking Process.* New York: Harper & Row Publishers, 1969.

THE RELATIONSHIP OF WRITING TO ASPECTS OF INTELLIGENCE AND READING

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The relationship among the various language arts (listening, speaking, reading, writing) has generally been established as high and positive in recent research (Schieb, 1978). Some researchers (Stotsky, 1975 and Combs, 1977) have found this relationship to be causal. Thus, by improving proficiency in one language art there is often a simultaneous improvement in another language art. In this regard writing and reading appear to be the two language arts areas most often linked.

Applebee (1977) has found the high positive correlation among the various language skills to evolve from their mutual dependence upon syntactic maturity. He reported that reading and writing experiences tend to increase syntactic maturity and therefore improve each other.

Elementary children are generally introduced to writing after instruction in reading. Chomsky (1971) argues that children are developmentally prepared to write before they are ready to read and that their introduction to print should be through writing.

While the research concerning the relationship among the various language skills is well documented, the research concerning the relationship between the various language skills and intelligence is best described as inconclusive and controversial. Although reading and writing achievement has been found to be related to intelligence, intelligence alone will not determine how well a given student will read or write. Some researchers have found there to be a higher and more positive relationship between intelligence and writing than between intelligence and reading (Myklebust, 1973). This strong relationship is attributed to the high level of abstract thinking required for writing (Kirk and Elkins, 1975). The inefficiency of predicting a student's reading or writing performances based upon intelligence scores is greatest with elementary students.

At present, many school districts have abandoned or greatly reduced their use of I.Q. score.

Those school districts and institutions which do use I.Q. tests will most often use the Wechsler Intelligence Scale for Children-Revised (WISC-R) or the Standford-Binet as their screening instrument. The WISC-R is the intelligence scale most often used in the UGA Reading Clinic and the instrument used in this study.

The WISC is an individually administered intelligence test which was published in 1949. It was standardized on a total of 2,200 children, all white, and the 1940 census was used to decide the distribution of the norming sample. The revised WISC was published in 1974 and normed on a representative sample of the 1970 U.S. Census. Minorities were used int he norming sample for the 1970 version of the test.

The WISC-R is designed to be used with children aged 6.0 years to 15 years 11 months.

The test is divided into two parts, a Verbal Scale and a Performance Scale, each of these parts has five required subtests and one subtest that can be used as an alternative or supplemented.

In general, researchers have found the WISC-R to be more reliable than group I.Q. test, but are undecided whether the Verbal, Performance or Full Scale scores are more closely related to reading expectency. However, after reviewing much of the literature Harris and Sipay report that the general conclusion is that fewer mistakes will be made relying upon the Full Scale I.Q.

Purpose

The purpose of this study was to examine the relationship of measures of reading ability to various measures of intellectual and writing performnce of the same subjects. All measures were obtained in the UGA Reading Clinic. Ten variables were selected to be compared in this particular study. The variables were choosen because reported association with reading performance in previous research.

Subjects

The subjects used in this study consisted of 79 students in grades 1 through 6 who were tested in the University of Georgia Reading Clinic during the 1980/81 school year. The primary reason for referral to this clinic is the presence of a reading problem in school. Several of the students tested, however, were not having reading problems and were tested to ascertain existing reading strengths and weaknesses. Thus, the saple is not as truncated as one might normally expect from a clinic population. All testing was done in a one day visit to the clinic by the subjects. The various tests administered at this time depended upon the students' diagnostic needs. Therefore, not all subjects were administered the same tests. This accounts for the range of 56 to 79 subjects on the various measures. Students below or above the grades mentioned above were occasionally tested in the clinic but not in sufficient numbers to justify their inclusion in the study.

All tests were administered by graduate students under the supervision of clinic personnel. Subjects usually worked with four different clinicians during their day of testing. A day in the clinic began at 8 a.m. and usually concluded at approximately 3:30 p.m. with a one hour break for lunch.

The Variables

The data for this study were collected after the subjects were scheduled and tested in the clinic. No special considerations during the subject's testing were made to facilitate the study. The following ten variables were examined:

1. Wechsler Intelligence Scale for Children-Revised—Verbal Scale
2. Wechsler Intelligence Scale for Children-Revised—Performance Scale
3. Wechsler Intelligence Scale for Children-Revised—Full Scale
4. An IRI-Instructional Level Score
5. Morris-McCall Spelling Score
6. The Woodcock Reading Test—Passage Comprehension Score
7. A Legibility Score
8. Number of T-Units in Writing Sample
9. Subjects Grade Level at the Time of Testing
10. Percent of Misspelled Words in the Clinic Writing Sample

Statistical Procedure

Pearson product-moment correlational coefficients were computed to determine the relationships between the ten measures collected in the clinic. The results of the analysis are presented in Table 1. Those subjects who are missing scores for no more than one of the variables are the only subjects whose scores are recorded in this table.

The Writing Sample

All students were shown a five by eight inch color painting of a rural farm community and read the following directions:

> Look carefully at this picture and think about what it is showing or what the people are doing in the peture. Write at least three sentences about the picture.

The writing samples were scored on legibility and the number of t-units. The legibility scores were obtained by having 18 elementary teachers—3 for each of the grade levels in the study-rank the samples as either above average (1), average (2), or below average (3).

T-units, for the purpose of this study, are defined as any combinations of a subject noun phase and a verb, including all object noun phrases and subordinate classes.

REFERENCES

Applebee, A. N. Writing and reading, *Journal of Reading*, 1977, *20*, 534-537.

Chomsky, C. Write first, read later. *Childhood Education*, 1971, *47*, 296-299.

Combs, W. E. Sentence-Combining practice Aids reading Comprehension. *Journal of Reading*, 1977, *21*, 18-24.

Kirk, S. A. and Elkins, J. Characteristics of Children enrolled in the Child Service Demonstration Centers. *Journal of Learning Disabilities*, 1975, *8*, 630-637.

Mykleburst, H. R. *Development and disorders of written language*, Volume Two, New York: Grune and Stratton, 1973.

Scheib, V. V. The relationship among the various abilities: oral reading, written language, oral language and verbal language in grades one through eight (Doctoral dissertation, Brigham Young University, 1978). DAI, 1978, *39*, 337A.

Stotsky, S. L. Sentence-combining as a curricular activity: Its effect on written language development and reading comprehension. *Research in the Teaching of English*, 1975, *9*, 30-71.

Table 1
CORRELATION COEFFICIENTS FOR ALL VARIABLES

	Grade	Woodcock Passage	Legibility	Percentage Misspelled	T-Units	Morris-McCall Spelling	IRI	WISC-R Full Scale	WISC-R Performance	WISC-R Verbal
WISC-R Verbal	−.121*	.505*	−.014	−.094	.015	.222*	.290*	.908*	.555*	1.000
WISC-R Performance	.099	.342*	−.168	−.001	.012	.189	.270*	.850*	1.000	
WISC-R Total	−.029	.482*	−.086	−.094	.004	.233*	.313*	1.000		
IRI	.642*	.773*	−.117	−.310*	.351*	.693*	1.000			
Morris-McCall Spelling	.690*	.789*	−.180	−.343*	.132	1.000				
T-Units	.215	.217	−.197	−.138	1.000					
Percentage Misspelled	−.309*	−.375*	.290*	1.000						
Legibility	.001	−.103	1.000							
Woodcock Passage	.590*	1.000								
Grade	1.000									

**Significant at or beyond the .05 level*

AN INVESTIGATION OF THIRD GRADERS' LISTENING COMPREHENSION OF HUMOROUS CHILDREN'S LITERATURE

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This study was an investigation of third grade boys' and girls' listening comprehension of selected categories of humor present in children's literature. The listening comprehension of the nonhumorous and humorous story elements within humorous picture books was examined to determine if significant differences exist between third graders' comprehension of the two.

A review of the relevant research indicated that children are very interested in reading books that are humorous (Gates, 1930; Gunderson, 1957; Kirsch, Pehrsson, and Robinson, 1976; Peltola, 1963; Smith, 1962; Witty, Coomer, and McBean, 1946). It was also found that age and cognitive development make a difference in how a child responds to humorous stimuli. However, the research of sex differences was divided concerning the role sex has in comprehension of humor (McGhee, 1971; 1976a; Petry, 1978; Zigler, Levine, and Gould, 1967).

The limited research of humor's effect on learning and comprehension vary from humor having a facilitating effect to its having no effect (Curran, 1973; Davies and Apter, 1980; Ferris, 1970; Hauck and Thomas, 1972; Houdoumadi, 1977; Kaplan and Pascoe, 1977; Terry and Woods, 1975; Weinberg, 1973; Zillman and Williams, 1980). A positive relationship appears to exist between listening and reading comprehension, making it possible to draw conclusions about children's reading comprehension of the humorous and nonhumorous elements of picture books through their listening comprehension (Berger and Perfetti, 1977; Devine, 1978; Duker, 1961, Durrell, 1969; Elgart, 1978; Kirkham, 1977; Kreamer, 1973).

Therefore, oral presentation of humorous stimuli could allow for the social interaction that is important in much humorous material as well as differences in reading ability among the third graders. The review of the research suggested that picture books would be an appropriate context for measuring children's listening comprehension of humor in literature because of their value in developing the oral language and reading competence of young children (Curtis, 1968; Dwyr, 1976, Rohwer and Matz, 1975).

The subjects for the study were 67 third grade students, 36 boys and 31 girls, from a rural county in northeast Georgia. The students were from heterogeneous classrooms and their reading levels were average and below average.

The materials used were 36 tape recorded humorous picture books. These humorous picture books were representative of nine categories of humor defined by Kappas (1965): exaggeration, surprise, slapstick, the absurd, human predicament, ridicule, defiance, violence, and verbal humor. Four books were selected for each of the nine categories; each selection was a book judged to be an appropriate representation of that category.

The instrument used in this study was a researcher—designed multiple choice test consisting of ten items, five measuring the listening comprehension of nonhumorous story elements and five measuring the listening comprehension of humorous story elements. Such a test was constructed for each of the 36 humorous picture books.

Data collection consisted of the following. During a five week period, groups of approximately 15 students at a time listened to the tape recorded humorous picture books. The sample of 36 picture books was randomly assigned to the four classes of third graders so that each class listened to nine picture books, one from each of the nine categories of humor. For each book, the multiple-choice test was administered with the researcher reading the test aloud to the students.

The following hypotheses, stated in the null and tested at the .05 level of significance, were concerned with third grader students' listening comprehension of humorous picture books. The categories of humor referred to in the hypotheses were those compiled and defined by Kappas (1965).

1. There will be no significant differences in the listening comprehension among the categories of humor.
2. There will be no significant differences between the listening comprehension of humorous and nonhumorous elements of the books.
3. There will be no significant differences between boys' and girls' listening comprehension

A repeated measure of analysis of variance with category

being the repeated factor was used to test Hypothesis One. If the analysis of variance resulted in a significant F value, Duncan's New Multiple Range Test (Kirk, 1968) was used to determine the sources of differences. An analysis of variance was also used to test Hypotheses Two and Three. The .05 level of significance was set to reject the null hypotheses.

Findings

Hypotheses One stated that there would be no significant differences in third graders' listening comprehension among the categories of humor. Results of the analysis of variance were significant, $F(8,520)=7.434$, $p \times .05$.

The analysis indicated that there was a significant difference in third graders' listening comprehension among the categories of humor. A Duncan's New Multiple Range Test was computed to compare the listening comprehension means of the nine categories of humor. Results indicated that the absurd category was comprehended to a significantly greater degree than the categories of violence, slapstick, ridicule, defiance, and verbal humor. Human predicament and surprise were comprehended to a significantly lesser degree. Since a number of the comparisons categories. Of the nine categories, violence was comprehended to a significantl lesser degree. Since a number of the comparisons revealed significant differences, Hypothesis One was rejected.

Hypotheses Two stated that there would be no significant differences between the listening comprehension of humorous and nonhumorous elements of the picture books.

The analysis indicated that there was a significant difference [$F(1,65)=16,171$, $p \times .05$] between third graders' listening comprehension of humorous and nonhumorous elements of the picture books. A comparison of the mean scores of third graders' listening comprehension of humorous story elements indicated that the nonhumorous story elements were comprehended to a significantly greater degree. As a result of the statistical analysis, Hypothesis Two was rejected.

Hypothesis Three stated that there would be no significant differences between boys' and girls' listening comprehension of the picture books.

The computations indicated that there were no significant differences; therefore, Hypothesis Three was not rejected.

Discussion of the Findings

According to the incongruity theory upon which this investigation was based, humor arises from "disjointed, ill-suited pairings of ideas or situations that are divergent from habitual customs" (Keith-Spiegel, 1972, p. 110). Investigators advancing the incongruity theory surmise that incongrous relationships are always present in humor. Considering the incongruity theory from a develomental prespective, McGhee (1979) suggested that in the first seven or eight years the child goes through stages which correspond to particular cognitive acquisitions. Third graders should be within stage four, which is the most complex. During this stage, humor first begins to resemble the humor of adults. Children are now becoming aware of the ambiguity that may exist in the meanings of words. The eight year old child is less egocentric and more likely not to appreciate humor of a cruel or violent nature unless the act is recognized as accidental or unintentional.

The results of the third graders' comprehension of humorous picture books support the theory by McGhee (1979) that stage four children usually avoid humor of a cruel and violent nature, since books in the violence category were significantly less comprehended than the other eight categories. Perhaps this avoidanee does not allow the student to concentrate on or attend to humorous stimuli; therefore, these stimuli are not comprehended as well as other types.

Although certain categories of humor are comprehended to a significantly greater degree, the nonhumorous story elements were comprehended to a significantly greater degree than the humorous story elements. Terry and Woods (1975) also found similar results with third graders concerning humorous and nonhumorous testing materials. The researchers attempted to explain their findings in terms of the relationship between age and test anxiety and between humor and arousal. As a person advances through educational levels it is assumed that the importance of academic testing increases, thereore, so does test anxiety. Thus it is assumed that third graders are less tense than older children. Terry and Woods (1975) stated that perhaps these students were even below the optimum level of tension for effective test performance. The researchers speculated that the combination of instructions deemphasizing the importance of the test and the humor manipultions would have further reduced students' level of test anxiety. If third graders are initially low in arousal, then further reduction would be revealed in lower performance. Perhaps a similar phenomena occurred in the present study. The children were very relaxed and appeared to feel that the data collection sessions were enjoyable. Apparently they looked forward to the researcher's visits and anticipated listening to the humorous stories with excitement. The researcher always emphasized at the beginning of cach listening session that the students were to do their best, but that their performance would not affect their grades. While listening to many of the humorous story parts the children would laugh and "roll on the floor with glee." Although this relaxed atmosphere added to the children's enjoyment of the stories, it may not have facilitated the memory or understanding of humorous story elements.

Davies and Apter (1980) found no significant differences between scores obtained as a result of children viewing either a humorou or onhumorous audiovisual slide-tape teaching program. The researchers stated that perhaps the type of humor used could be important and more research was needed. However, the present study revealed that among different types of humor, the nonhumorous story elements were significantly better comprehended. In past humor research, the comprehension of humorous and nonhumorous information was measured using different content.

Therefore, even though an attempt may have been made to select materials that were equal in difficulty and interest level, the question of whether the nonhumorous or humorous materials were inherently more or less difficult or interesting still exists. The present study employed humorous clements and nonhumorous elements from the same source, thereby decreasing the likelihood that the difficulty and interest level of the materials would affect the results. Because the nonhumorous story elements were significantly better comprehended in this study, it is evident that humorous information is more difficult for children to understand.

No sex differences were found in the comprehension of the categories of humor. Unfortunately, most of the studies which investigated sex differences have limited this investigation for the most part to the appreciaton of humor. And those investigations which studied the comprehension of humor usually were not concerned with sex differences (McGhee, 1971; 1976b; Zigler, Levine, and Gould, 1966, 1967). The investigation done by Petry (1978) revealed that no sex differences existed in third and fifth graders' comprehension of humor in literature. Her findings are in agreement with the findings of the present study, which also found no sex differences. However, further research is needed since little investigation of sex differences in children's comprehension of humor has been done.

Implications for Classroom Instruction

The present study has generated a number of implications for classroom instruction. Teachers should know that significant differences do exist among types of humor students comprehend. Therefore, the use of humorous materials should stress those types of humor children especially prefer and comprehend.

Other types of humor can be included; however, the teacher should make certain that students understand the humor by giving special attention to the more difficult types.

The present study revealed that no significant differences exist between third grade girls' and boys comprehension of different types of humor. Therefore, it should be possible to employ similar humorous materials with each group. Since other research has revealed conflicting results, teachers should observo charactertistic patterns within their own classrooms and make judgment as to whether different types of humor are comprehended by boys and girls.

Humor has been found to have both facilitating effects on comprehension in some studies and no facilitating effects in others. Because the present investigation revealed that nonhumorous story elements were better comprehended, the researcher feels that humor should be incorporated in the reading classroom with caution. Evidence from the present study does not support the idea that humor might facilitate comprehension. Therefore, perhaps teachers should build upon the children's appreciation of and interest in humorous stories to improve their comprehension of humorous story elements. Students could be allowed to share the humor through open discussions, oral reading, and role playing of humorous story parts. During teacher directed questioning, emphasis should be placed upon the understanding of why humorous story elements are perceived as funny and how these relate to the nonhumorous story elements. In addition to encouaging the comprehension of humor within reading materials, teachers could possibly use humor to gain the students' attention before important nonhumorous information is presented. Although research is needed concerning this idea, it may be speculated that humor could be used to facilitate learning and comprehension even when the humorour stimuli is not a part of the information being learned.

Perhaps the most important implication is that educators should not assume that children equally appreciate and understand all types of humor. If teachers want children to appreciate and understand all categories of humor then it should be recognized that some categories will require more instruction and exposure than others.

REFERENCES

Berger, N. A., and Perfetti, C. A. Reading skill and memory for spoken and written discorse. *Journal of Reading Behaviro,* 1977, *9,* 7-16.

Curran, F. W. A developmental study of cartoon humor appreciation and its use in facilitating learning (Doctoral dissertation, Catholic University of America, 1973). *Dissertation Abstracts International,* 1973, *33,* 5487B. (University Microfilms No. 73-20984)

Curtis, W. J. An analysis of the relationship of illustration and text in picture story books as indicated by the oral responses of young children (Doctoral dissertation, Wayne State University, 1968). *Dissertation Abstracts International,* 1969, *30,* 924A-925A. (University Microfilms No. 69-14, 665)

Davies, A. P. and Apter, M. J. Humour and its effect on learning in children. In E. P. McGhee and A. J. Chapman (Eds.), *Children's humour.* Chichester, England: John Wiley and Sons, 1980.

Devine, T. G. Listening: What do we know after fifty years of research and theorizing? *Journal of Reading,* 1978, *21,* 296-303.

Duker, S. *A bibliography on listening.* Brooklyn, New York: Office of Testing and Research, Brooklyn College, 1961.

Durrell, D. Listening comprehension versus reading comprehension, *Journal of Reding,* 1969, *12,* 455-560.

Dwyer, E. J. *Recent research and implications concerning children's literature and reading instruction.* 1976. (ERIC Document Reproduction Service No. ED 133 701)

Elgart, D. B. Oral reading, silent reading, and listening comprehension: A comparative study. *Journal of Reading Behavior,* 1978, *10,* 203-207.

Ferris, D. R. The effects of humorous literary content on immediate and delayed comprehension. In C. Pennock (Ed.), *Reading comprehension at four linguistic levels.* Newark, Delaware: International Reading Association, 1979.

Gates, A. I. *Interest and ability in reading.* New York: MacMillan Publishing Company, 1930.

Gunderson, A. G. What seven-year-olds like in books. *Journal of Educational Research,* 1957, *50,* 509-520.

Hauck, W. E., and Thomas, J. W. The relationship of humor to intelligence, creativity, and intentional and incidental learning. *Journal of Experimental Education,* 1972, *40,* 52-55.

Houndoumadi, A. Humor as a facilitator in the learning and retention of written instructional material (Doctoral dissertation, University of Oregon, 1977). *Dissertation Abstracts International,* 1977, *38,* 3380A. (University Microfilms No. 77-26448).

Kaplan, R. M. and Pascoe, G. C. Humorous lectures and humorous examples: Some effects upon comprehesion and retenion. *Journal of Educational Psychology,* 1977, *69,* 61-65.

Kappas, K. H. A study of humor in children's hooks. (Unpublished M. A. thesis, University of Chicago, 1965).

Keith-Spiegel, P. Early conceptions of humor: Varieties and issues. In J. H. Goldstein and P. E. McGhee (Eds.), *The psychology of humor.* New York: Academic Press, 1972.

Kirk, R. *Experimental design: Procedures for the behavioral sciences.* Belmont, California: Brooks/Cole Publishing Company, 1968.

Kirkham, S. G. A comparison of silent reading, oral reading, and listening comprehension of students in grades 3, 6, 9, 12 (Doctoral dissertation, University of Wisconsin-Madison, 1977). *Dissertation Abstracts International,* 1978, *38,* 4458A. (University Microfilms No. 77-19769).

Kirsch, D. L. Pehrsson, R. S., and Robinson, H. A. Expressed reading interests of young children: An international study. In J. E. Merritt (Ed.), *New horizons in reading.* Newark, Delaware: International Reading Association, 1976.

Kreamer, T. L. Listening comprehension as a predictor of first grade reading achievement (Doctoral dissertation, McNeese State University, 1973). *Dissertation Abstracts International,* 1973, *34,* 1487A-1488A (University Microfilms No. 73-22718).

McGhee, P. E. Children's appreciation of humor: A test of the cognitive-conruency principle. *Child Development,* 1976, *47,* 420-426. (a).

McGhee, P. E. *Humor its origin and development.* San Francisco: W. H. Freeman and Company, 1979.

McGhee, P. E. Sex differences in children's humor. *Journal of Communication,* 1976, *26,* 176-189. (b).

McGhee, P. E. The role of operational thinking in children's comprehension and appreciation of humor. *Child Development,* 1971, *42,* 733-744.

Peltola, B. J. A study of children's book choices. *Elementary English,* 1963, *40,* 690-695, 702.

Petry, A. K. Young children's responses to three types of humor (Doctoral dissertation, University of Connecticut, 1978). *Dissertation Abstracts International,* 1979, *39,* 5525B. (University Microfilms No. 7911402).

Rhower, W D., and Matz, R. D. Improving aural comprehension in white andin black children. *Journal of Experimantal Child Psychology,* 1975, *19,* 23-26

Smith, R. C. Children's reading choices and basic reader content. *Elementary English,* 1962, *39,* 202-209.

Terry, R. L., and Woods, M. E. Effects of humor on the test performance of elementary school children. *Psychology in the Schools,* 1975, *12,* 182-185.

Weinherg, M. D. The interactional effect of humor and anxiety on academic performance (Doctoral dissertation, Yeshiva University, 1973). *Dissertation Abstracts International,* 1974, *35,* 492B. (University Microfilms No. 74-16463)

Witty, P., Coomer, A., and McBean, D. Children's choices of favorite books: A study conducted in ten elementary schools. *Journal of Educational Psychology,* 1946, *37,* 266-278.

Zigler, E., Levine, J., and Gould, L. Cognitive challenge as a factor in children's humor appreciation of humor. *Journal of Personality and Social Psychology,* 1967, *6,* 332-336.

Zigler, E., Levine, J., and Gould, L. Cognitive processes in the development of children's appreciation of humor. *Child Developmant,* 1966, *37,* 507-518.

Zillman, D., and Williams, B. Acquisition of information from educational television programs as a function of differently paced humorous inserts. *Journal of Educational Psychology,* 1980, *72,* 170-180.

READING COURSES FOR TEACHERS IN THE DISCIPLINES: ON THE INCORPORATION OF ISSUES FROM CRITICAL CURRICULUM THEORY

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"The tendency of educational development to proceed by reaction from one thing to another, to adopt for one year, or for a term of seven years, this or that new study or method of teaching, and then as abruptly to swing over to some new educational gospel; is a result which would be impossible if teachers were adequately moved by their own independent intelligence. The willingness of teachers, especially of those occupying administrative postions, to become submerged in the routine detail of their callings, to expend the bulk of their energy upon forms and rules and regulations, and reports and percentages, is another evidence of the absence of intellectual vitality. If teachers were possessed by the spirit of an abiding student of education this spirit would find some way of breaking through the mesh and coil of circumstance and would find expression for itself" (Dewey 1904, p. 321).

Dewey sets forth a tremendous challenge which is just as important today as it was eighty years ago. In effect, he argues that although educators are necessarily immersed in the detailed operations of their educational roles, they should maintain a foundationally questioning posture and see beyond immediate necessity as "students of education" in a larger sense. The purpose of this paper is to present one method which has been successful in helping education students enrolled in "Reading in the Content Areas" to develop a broader sense of "students of education"; and, at the same time, facilitate the processing of specific information about the incorporation of reading strategies into the teaching of various disciplines. First, the difficulties involved in maintaining this larger perspective will be discussed; second, the issues and materials used to foster a broader perspective will be detailed; and third, positive aspects of the implementation procedures will be reported.

Difficulties In Developing Overall Perspectives

How can education students in content reading courses be encouraged to grow as true "students of education"? A central problem involved in answering this question revolves around the concept of paradigm as developed by Thomas Kuhn in *The Structure of Scientific Revolutions.* A paradigm, in Kuhn's terms is more than a similarity in methodological procedure. Rather, it is a natural convergence of individuals with similar fundamental ideologies. He states that although there are "seminole" thinkers who actually create fundamentally new perspectives, generally, individual researchers and scientists accept as given a particular perspective and procede with what he labels "normal" science. In "normal" science the focus is on clarification and refinement of previously accepted perspectives.

The basic idea behind Kuhn's conception of paradigm is applicable to education in general, the area of reading, and specifically reading in the disciplines. As Dewey states, educators do tend to "proceed by reaction from one thing to another" in groups. This sense of group identity not only exists but is also transmitted to pre-service and in-service teachers by teacher educators through course work such as "Reading in the Content Areas", and, in turn our students transmit this propensity for the acceptance of givens to their students in elementary schools and high schools. Greene states that because teachers are "often submerged in the bureaucracies for which they work, they simply accede to what is taken for granted. Identifying themselves as spokespersons for—or representatives of—the system is its local manifestation, they avoid interrogation and critique. They transmit, often tacitly, benign or neutral versions of the social reality. They may, deliberately or not, adapt these to accommodate to what they perceive to be the class origins or the capacities of their students, but, whether they are moving those young people towards assembly lines or administrative offices, they are likely to present the world around as given, probably unchangeable and predefined" (p. 56).

The "givens" Greene refers to here are those which define the limits of particular paradigms, Popkewitz (1980) describes the existence of three fundamentally different paradigms in education: empirical/analytical, symbolic and critical. Briefly, the empirical/analytical paradigm is modeled after physical science. There is a reliance on the replicable measure of observable data, objectivity and the use of "scientific method". The "symbolic" paradigm utilizes a view borrowed from psychology, sociology, and anthropology. From this perspective, case studies and in-depth ethnographic procedures are used to uncover the meanings of language usage, societal roles and individual or group interrelationships. In the critical paradigm, analysis of the political and ideological underpinnings of education are examined in an effort to expose the latent function of schooling as situated within the nexus of a modern technological society. Particular attention is given to the unequal distribution of power and wealth in society and the role of schools in maintaining the existing hierarchical framework.

An examination of popular contemporary reading periodicals, such as *The Reading Research Quarterly, The Journal of Reading, The Reading Teacher, The Journal of Reading Behavior,* would clearly indicate the empirical/analytical paradigm is the predominate reading research paradigm. In an examination of contemporary reading texts, Beyer and Rouse (1981) found a similar reliance on empirical/analytical perspective as the foundation and support for reading methods texts.

This similarity in foundational perspective throughout a field such as "reading" is, at least in part, responsible for the ease with which educators, in Dewey's words, "swing over to some new educational gospel." The result can be teachers who are tailored as dispensers of pre-packaged educational doctrine rather than "students of education" who are capable of bringing their own intellect to bear on education as a means of emancipation.

Given the need for a broad perspective and Dewey's differentiation between teacher training versus teacher education, the value of presenting diverse alernatives to popular procedures becomes clear.

Issues And Materials For An Alternative Perspective

In a field such as reading which focuses in part on various teaching styles, techniques, and strategies, there is a natural inclination to conceive of teaching as a technical, quantifiable, and ameliorative activity. Given the continual demands placed upon classroom teachers to respond to and interact with students and cirricula on a variety of levels, this emphasis on amelioration and technique is understandable. In the area of reading instruction, the task of the reading teacher if often thought to consist of applying the proper series of "treatments" or "interventions" to enable the student to improve his or her reading performance, as measured through observable behaviors. This orientation has the effect of regarding reading as primarily an apolitical enterprise to be taught by specialists who have mastered the requisite skills, techniques and materials.

Within the last decade or two there have been developments in curriculum theory which directly challenge this apolitical orientation. Rather than treating schools as neutral institutions, to be understood via the application of specific input and output measures, a large body of recent scholarship in curriculum inquiry has sought to explicate the social, political, and ideological role schools serve in contemporary society. In this area, answers are sought to questions such as: whose knowledge gets taught in schools; what are the hidden and overt meanings which become attached to school practice; how are these related to the continued dominance of certain social classes at the expense

of other, less powerful groups; and so on. Questions like these have spawned an interest in the ways in which schools serve as agents of economic and cultural reproduction.

For example, Bowles and Gintis (1976) argue that the hidden curriculum of schools corresponds to the dispositional and psychological needs of a capitalist labor market. Young (1971) urges us to consider how forms of knowledge and their dissemination may be related to the unequal distribution of goods and power in society. In rejecting correspondence theories of ideological domination, Apple (1976) argues that the hegemonic control of cultural practices and institutions requires a less mechanistic, more mediated analysis. These and other writers in education have greatly extended our understanding of the ideological and political purposes of educational institutions.

In an effort to convey this critical view of existing practice, three articles have been particularly helpful in getting students enrolled in "Reading in the Content Areas" to see beyond the mastery of specific techniques to the positioning of these ideas within a larger ideological and political perspective. First, Maxine Green's "The Matter of Mystification: Teacher Education in Unquiet Times" from her book *Landscapes of Learning* (Teachers College Press, 1978) articulates the pressing need for educators at all levels to challenge the apparent "givens" within which they work and to move toward more "authentic" ways of relating within the educational context. She presents a very strong argument for the fact that many of our world conceptions are formed in a state of mystification. As a result, a large part of our energies as educators are focused on "surface" realities." In the process, attention is distracted from the real purposes and implications underlying our activities.

An example from contemporary practices in high schools may help to clarify the concept of mystification and its relationship to reading. Some high school teachers have responded to a decline in the reading ability of their students by decreasing the amount and difficulty of reading assignments, and by replacing reading as the major learning medium, with lecture and audio visual methods.

On the surface, this change may have helped some students master specific aspects of isolated content. In the process, however, the larger issue of teaching students "how to learn" and tapping the vast horizons of incidental learning through individual wide reading has lost ground. In effect, the focus on mastering specific content material in isolation has, in some ways, masqued a deeper problem of general access to information and literature. On another level, teachers who accept the limited reading performance of their students and resort to coping strategies as in this example, actually help perpetuate societal inequalities by limiting general social mobility. (For a detailed analysis of this concept, see Apple, 1979.)

Second, two chapters from Michael Apples' *Ideology and Curriculum* (Routledge and Kegan Paul, 1979) are particularly useful in helping students see the political origins and power structure underlying the development of schools and the ideological impact of the activities in which they are involved. In "Curricular History and Social Control" (p. 61-81) Apple examines the influence of powerful groups in society on the formation and direction of public education. In his chapter titled "Commonsense Categories and the Politics of Labeling" (p. 123-153), Apple lays out some of the adverse consequences in the over use of labeling and categorization procedures. Beyond its value in opening student minds to an alternative perspective, this chapter is of special relevance to the area of reading with its use of standardized measures of performance, ability grouping and special programs for "disabled readers."

A third article which is especially helpful is John Bartholomew's "Schooling Teachers: The Myth of the Liberal College" (p. 114-123) from *Explorations in the Politics of School Knowledge*, (Nafferton, 1976). Bartholomew argues that although college and university educators teach liberal ideas, they do so utilizing a conservative framework in the process. The result is a situation in which students are forced to separate their mental activity from the actual practices in which they are involved. Just as Dewey distinguished "internal" and "external" attention for elementary students, Bartholomew argues that education students are required to separate theory (that which is talked about in education classes) from practice (those things that professors actually do). The knowledge of this separation for students can mean an increased awareness of the limitation of their educational preparation and the propensity they are likely to have for practicing, as teachers, not what they have talked about theoretically but the conservatism which they have practiced all along.

Implementation

The perspectives referred to above can be incorporated into courses for teachers of reading in the disciplines by simply using these articles as examples of "content" in giving demonstrations of content reading techniques. When this is done, not only are alternative perspectives presented but there are the additional pedogogical benefits of increasing teacher empathy for future students, providing concrete examples for the demonstration of important reading skills, and helping students understand the utility of specific reading techniques.

A big problem for pre-service teachers is understanding the relevance of abstract educational content. In short, because they have no "teaching" experience, it is often difficult for them to understand the complexities of teaching students with backgrounds which are diverse from their own. In-service teachers also can lose sight of the difficulty of the material they work with because of their continual contact with it. In both cases, some teachers have little empathy for students who are having a difficult time with their content material. Because the above mentioned articles are written for curriculum theorists, they are written with a heavy semantic load and address issues with terminology which is generally unfamiliar to individuals without a background in curriculum theory. The result is that for a majority of students, these articles are written close to their frustration levels and in reading them, they experience feelings which are similar to those many of their own students will face.

Pedogogically, there is little question about the importance of concrete examples. And, the above mentioned articles have proven very useful in demonstrating and giving students practice in content related reading topics such as the use of readability formulas, SW3R, differences between expository and narrative text, etc.

A particularly useful aspect of using these articles is in helping teachers see the utility of important reading techniques. By using these articles not only do students get contact with diverse issues, a sense of empathy for future students and concrete experience, but furthermore, they can experience the benefits of specific reading techniques themselves. For example, in teaching the importance of previewing important vocabulary in a directed reading activity, half of the class might read a section of Maxine Green's, "The Matter of Mystification: Teacher Education in Unquiet Times" without discussing the definitions of key terms. In a post-reading comparison of the understanding of key concept, students who had the advantage of an introduction to important vocabulary have invariably demonstrated a deeper understanding of what they read. It seems likely that individuals who experience the positive effect of techniques such as these as learners will be

influenced to use them when helping their own students.

REFERENCES

Apple, M. *Ideology and curriculum.* London: Routledge and Kegan Paul, 1979.

Bartholomew, J. Schooling teachers: The myth of liberal college. In G. Witty and M. Young (Eds.), *Explorations in the politics of school knowledge.* Driffield: Nafferton, 1976.

Beyer, L. & Rouse, R. Textbooks for preparing reading teachers: An analysis from curriculum theory, presentation to the annual meeting of the American Educational Research Association, April 1981.

Bowles, S. & Gintis, H. *Schooling in capitalist America.* New York: Basic Books, Inc., 1976.

Dewey, J. The relation of theory to practice in education. In Reginald D. Archambault (Ed.) *John Deway on education.* Chicago: University of Chicago Press, 1974.

Greene, M. *Landscapes of learning.* New York: Teachers College Press, 1978.

Kuhn, T. *The structure of scientific revolutions* (2nd ed.). Chicago: University of Chicago Press, 1970.

Popkewitz, T. Paradigms in educational science: different meanings and purpose to theory. *The Journal of Education,* 1980, *162,* 28-46.

Young, M. *Knowledge and control.* London: Collier-Macmillan Publishers, 1971.

THE EFFECT OF COGNITIVE STYLE ON READING AND WRITING IN SCIENCE MATERIALS

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In recent years language researchers have given increasing attention to exploring a number of variables associated with the reading and writing processes. In particular, Bruce, Collins, Rubin, & Genter (1978); Flower (1979); and Flower & Hayes (1977) have examined certain cognitive variables associated with the writing process, attempting in their studies to characterize cognitional relations between reading and writing. Atwell (1980) and Shanklin (1981) have gone so far as to assert that the same cognitive variables underlie both the reading and writing processes. The study reported here attempted to shed light upon this area of inquiry by examining the effect of one cognitive dimension upon the discourse processing operations involved in reading and writing, that of cognitive sytle.

Santostefano, Rutledge, & Randall (1965) characterize cognitive style as . . . "When perceiving, an individual's cognition is active, not passive, selecting, sorting and organizing information according to particular system principles which are influenced by motivational and personality factors" (p. 58). One inference that may be drawn from the concept of cognitive style is that the manner in which individuals process discourse in reading and writing will necessarily be influenced by their own stylistic patterns of cognition.

Field dependence-independence is one dimension of cognitive style that may influence how individuals process discourse. It refers to the characteristic modes of functioning which individual demonstrate in their cognitive activities. Witkin, Moore, Goodenough, & Cox (1977) described field-dependent persons as individuals who have difficulty with problems whose solutions depend on taking some critical element out of the context in which it is presented and restructuring it in some alternative way. Field-dependent persons tend to use a field as they find it, to make less use of surrounding information in processing a problem, and to have more difficulty in analyzing it. They experience separate parts of a perceptual field as fused; i.e., they are unable to differentiate parts from the total organization. On the other hand, field-independent persons are able to experience elements of a total organization as separate entities and are more likely to depart from the context of a given problem to generate a solution in an analytical, problem-solving fashion.

Of particular relevance to the present study is previous research carried out by Kagan (1980) and Spiro and Tirre (1979) which examined the correspondence between field dependence-independence and reading and writing. In a study using community college students, Kagan (1980) found that field dependence-independence correlated significantly with syntactic complexity. Specifically, she found that field-independent subjects were better able to embed coordinations and clauses within sentences and wrote significantly longer sentences than their field-dependent counterparts. Kagan concluded that field dependence-independence was clearly associated with the ability to manipulate language effectively.

Spiro & Tirre (1979), again using college students, examined the relation between field dependence-independence and subjects' ability to recall information from text. They found that field-independent subjects were better able to recall text by selectively applying relevant schemata to the text passages. Spiro and Tirre concluded that field dependence-independence is associated with the ability to capitalize on prior knowledge to increase recall of information, particularly when required to separate certain aspects of the text from the total context.

Birnbaum (1980) suggested the possibility that cognitive style is also related to differences observed in the rate of processing and reporting information in a study examining the composing and reading behaviors of fourth and seventh grade students. Therefore, the present study was undertaken to verify this suggestion and to extend the findings of Kagan (1980) and Spiro and Tirre (1979) to public school students. The major guiding question of this study was: To what extent can the character of a person's discourse processin operations be predicted by cognitive style? More specifically, the following research questions were posed:

1) To what extent does the measured level of field dependence-independence predict the syntactic complexity of written discourse?
2) To what extent does the measured level of field dependence-independence predict readers' engagement with text as reflected by the quality of the semantic content of their written recall of textual materials?

METHOD

Subjects

Subjects were 70 eighth-grade students from a school district in the Southeastern United States. Drawn from a predominantly middle socioeconomic population, the sample included approximately an equal number of blacks/whites and male/females. All subjects were considered to be good readers (70% or hetter national percentile) for their grade placement according to results of the *California Achievement Test,* Form 17C (1977).

Instruments

Field dependence-independence was measured by the *Group Embedded Figures Test* (GEFT). The GEFT (Oltman, Raskin, and Witkin, 1971) is a timed, group administered test consisting of 18 items which require test-takers to disembed figures from a field. The GEFT classifies individuals as field-independent or field-dependent according to the total number of correct responses.

To obtain samples of subjects' writing with science materials, O'Donnell and Hunt's *Aluminum* paragraph (Hunt, 1970) and Smith's *Bee* paragraph (Smith, 1972-73) were used. These passages were used to minimize syntactic variance attributable to content. Each paragraph consisted of a number of short, choppy kernel sentences. Subjects were directed to rewrite

the paragraphs, making it better and leaving out no information. Words could be added or omitted at the writer's discretion.

To obtain samples of subjects' recall, the eighth grade prototypes of the *Aluminum* and *Bee* paragraphs (Smith, 1971; 1972) were used. These paragraphs were written according to the data derived from Hunt (1970) and were typical of the syntactic characteristics exhibited by average eighth-graders. Thus, the difficulty level of these paragraphs insured that reading ability was not a factor in measuring recall. Subjects were directed to read the paragraphs and try to remember everything they could about it. Then they were asked to write down all they recalled, not worrying about spelling, punctuation, or grammar.

Procedure

Subjects were administered the GEFT to determine field dependence-independence. Those scoring between 1 and 9 were classified as field-dependent; those scoring between 10 and 18 were classified as field-independent. Scores ranged from 1 to 18. Two groups of 35 subjects resulted from the GEFT administration.

Both field-dependent and field-independent subjects were randomly assigned to one of two groups. One group was given the *Aluminum* passage to reconstruct in writing followed by the *Bee* passage to read and recall. In order to counterbalance for passage effect, the second group was given the *Bee* passage to reconstruct in writing followed by the *Aluminum* passage to read and recall. Thus, the first group consisted of 17 field-independent subjects and 18 field-dependent subjects. The second group consisted of 18 field-independent an 17 field-dependent subjects. Total data collection took approximately 60 minutes in two sessions.

Syntactic complexity of subjects' writing was determined by using the *Syntactic Density Score* (SDS) developed by Golub and Kidder (1974). This called for analyzing the texts for the presence of ten sentence variables, tabulating their frequency of occurrence, and computing them according to a weighted formula.

In order to provide a model against which to compare subjects' recall protocols, a template text base was prepared for each passage according to procedures detailed by Turner & Greene (1977). Each protocol text base was scored by comparing it to its template text base and examining it for the degree of similarity of recalls. Propositions of each protocol text base were then identified as either text reproductions, which repeated propositions in the template text base, or reader-based inferences, which were thematically related to the topic but possessing no other connection to it. Frequency of both text reproductions and reader-based inferences were tabulated.

Data Analysis

Data obtained were first analyzed using *t*-tests to examine differences between field-dependent and field-independent subjects in their performance on the two passages. No significant differences were found in the performance of field-independent subjects in syntactic complexity, text reproductions, and reader-based inferences on either the *Aluminum* or *Bee* passages. On the other hand, significant differences were found in the performance of field-dependent subjects on syntactic complexity only ($t(17)=2.32$, $p < .05$) for the passages.

Statistically significant differences were also found between field-independent and field-dependent subjeets on syntactic complexity across groups. Field-independent subjects produced syntactically more complex reconstructions of both the *Aluminum* and *Bee* passages ($t(17)=3.46$, $p < .01$; $t(17)=2.26$, $p < .05$) than their field-dependent counterparts.

Data were then analyzed using a stepwise regression analysis. Results of this analysis revealed that performance on the GEFT was significantly related to syntactic complexity ($F(1/68)=15.04$, $p < .001$), accounting for 18% of variance. Zero-order correlations, showed significant correlations between GEFT score and total number of words ($r=.37$, $p < .01$), total number of t-units ($r=.45$, $p < .0001$), main clause length ($r=.33$, $p < .01$), and number of unbound modifiers ($r=.31$, $p < .01$). Performance on the CAT also was related to syntactic complexity ($F(2,67)=9.79$, $p < .001$), accounting for an additional 5% of the variance. Thus, the best predictor of performance in manipulating language structures was found to be the GEFT score. A significant correlation was also found between the GEFT score and number of text reproductions indicating that field-independent subjects recalled more text propositions than field-dependent subjects ($r=.28$, $p < .05$).

DISCUSSION

The most significant finding resulting from this study is that field-independent individuals have an advantage over field-dependent individuals in their ability to deal with the structures of language. The ability to utilize subordinate language structures may be analogous to disassociating a figure from a complex field.

The findings of this study with eighth grade students show some similarity to the findings of Kagan (1980) with college level students. Field-independent subjects, regardless of grade level, seem better able to write significantly longer and syntactically more complex sentences than their field-dependent counterparts. However, while Kagan found that field-independent college students generated more caluses per T-unit, longer subordinate clauses, and a higher frequency of T-unit coordinations (use of *and* within the T-unit), field-independent eighth grade field-independent subjects showed more facility with unbound modifiers, while Kagan's college subjects did not. It may well be that college level field-dependent students have achieved sufficient facility with unbound modifiers through maturation to diminish such diferences. This possibility could be tested through a training study using younger field-dependent subjects.

No differences were found in field independent subjects' performance on syntactic complexity across the two passages. However, differences were found with field-dependent subjects. This differential performance could be explained by assuming that field-dependent individuals do not process and restructure text as readily as field-dependent individuals. A more plausible explanation is that field-dependent ndividuals will process text differently depending upon the amount of prior knowledge they bring to the restrueturing situation. Field-dependent subjects, apparently possessing more prior knowledge about bees than aluminum, are more readily able to utilize that knowledge in developing more complex syntactic structures. This concurs with the evidence supplied by Spiro & Tirre (1979) that field-dependent subjects less readily apply prior knowledge to textual situations.

This evidence also applies to the finding of this study that field-dependent individuals were able to produce more text-based propositions in recall. Additionally, such individuals, by definition, are more able to disassociate propositions from the total context for recall purposes than are field-dependent subjects.

Finally, performanee on the GEFT seems to be a much better predictor of performance in manipulating language structures than either reading achievement or language achievement as measured by standardized tests. The data suggest that is not sufficient to examine reading or language achievement scores and conjecture about quality of writing performance. Field dependence-independence is a more reliable predictor of writing maturity.

REFERENCES

Atwell, M. A. *The evolution of text: The interrelationships of reading and writing in the composing process.* Unpublished doctoral dissertation, Indiana University, 1980.

Birnbaum, J. C. *A study of reading and writing behaviors of selected fourth and seventh grade students.* Unpublished doctoral dissertation, Rutgers University, 1980.

Bruce, B., Collins, A., Rubin, A. D., & Genter, D. *A cognitive science approach to writing* (Tech. Rep. No. 89). Champaign, IL.: University of Illinois, Center for the Study of Reading, 1978.

California Achievement Test, Form 17C. Monterey, CA: CTB/McGraw-Hill, 1977.

Flower, L. S. Writer-based prose: A cognitive basis for problems in writing. *College English,* 1979, *41,* 19-37.

Flowers, L. S., & Hayes, J. R. Problem-solving strategies and the writing process. *College English,* 1977, *39,* 449-461.

Golub, L. S., & Kidder, C. Syntactic density and the computer. *Elementary English,* 1974, *51,* 1128-1131.

Hunt, K. W. Syntactic maturity in schoolchildren and adults. *Monographs of the Society for Research in Child Development,* 1970, *35,* 1, 1-67.

Kagan, D. M. Syntactic complexity and cognitive style. *Applied Psycholinguistics,* 1980, *1,* 111-122.

Donnell, R. C. A critique of some indices of syntactic maturity. *Research in the Teaching of English,* 1976, *10,* 31-38.

Oltman, P. K., Raskin, E., & Witkin, H. A. *Group Embedded Figures Test.* Palo Alto,CA: Consulting Psychologists Press, 1971.

Santostefano, S., Rutledge, L., & Randall, D. Cognitive styles and reading disability. *Psychology in the Schools,* 1965, *1,* 57-62.

Shanklin, N. K. L. *Relating reading and writing: Developing a transactional theory of the writing process.* Unpublished doctoral dissertation, Indiana University, 1981.

Smith, W. L. The effect of transformed syntactic structures on reading. In C. Braun (Ed.), *Language, reading, and the communication process.* Newark, DE: International Reading Association, 1971, 52-62.

Smith, W. L. The controlled instrument procedure for studying the effect of syntactic sophistication on reading: A second study. *Journal of Reading Behvior,* 1972-73, *5,* 242-251.

Spiro, R. J., & Tirre, W. C. *Individual differences in schema utilization during discourse processing* (Tech. Rep. No. 111). Champaign, IL.: niversity of Illinois, Center for the Study of Reading, 1979.

Turner, A., & Greene, E. *The construction and use of a propositional text base.* University of Colorado: Institute for the Study of Intellectunl Behavior, 1977, Tech. Rep. No. 63.

Witkin, H. A., Moore, C. A., Goodenough, D. R., & Cox, P. W. Field-dependent and field-independent cognitive styles and their educational implications. *Review of Educational Research,* 1977, *47,* 1-64.

READING COMPREHENSION OF STUDENTS ON POSTCLOZE PROCEDURES FOR TEXTBOOKS IN FIVE DISCIPLINES

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Funded by Title III (Strengthening Developing Institutions Program), our Instuctional System for Indvidual Differences has four basic subsystems. One of the subsystems relates primarily to developmental studies: (a) assessment in admissions, (b) developmental reading, (c) developmental English, (d) mathematics placement, and (e) oral communication.

The developmental reading component in our model has struggled through many difficulties in its attempt to identify a successful reading program for high risk students. In the first year of the Title III program, there was the concern for acquiring outstanding reading personnel to teach developmental reading and do research on developmental hypotheses. In the second year, much faculty effort, time, and administrtion focused on identifying the strengths and weaknesses in reading of all freshmen (c 1400) and then to urge faculty advisors and university administrative personnel to place students in the developmental reading courses. There was a widespread fear of testing, a fear of knowing the low abilities of students and a fear that testing would turn students of Eastern Kentucky to other universities to avoid the assessment program at Morehead State University (MSU). There was the stigma of having to take developmental reading "*because* you are a poor reader." In this third year (1981-82) of the grant, the identification and criterion problem is still with us. We continue to look for the reliable and valid way to identify the student with developmental lag in reading. When we identify students for developmental reading classes, we are still having great difficulty with students and advisors in persuading students, who need the individualized program in reading, to take the course and stay in the course for at least one semester.

Currently, the Reading Center administers the Reading Progress Scale (RPS) (Carver, 1970) to every freshman entering MSU at registration time. In 1981, a few more than 400 students failed the Reading Progress Scale (RPS). The failure rate was estimated at 29 percent of the freshman class. Every advisor was urged to be firm and rigorously counsel students to take developmental reading if they had ACT composite standard scores of 14 or below and high school GPA's below 3.2, or had failed the Reading Progress Scale, or had earned a 2.3 or lower gradepoint average in high school. Although 500 or more freshmen (1981) students should have taken developmental reading, only 227 of the 1420 students enrolled in Developmental Reading. Based on freshman entrance characteristics and first semester performance, we shall test a number of hypotheses relating to academic performance and retention between those students failing the RPS who took the Development Reading course and those who did not enroll in the course.

When we examined pretest and posttest scores of students, in developmental reading on the California Achievement Test (CAT), there was no significant difference between pretest and posttest raw scores on vocabulary or on comprehension. This result appears to be consistent with prior research in developmental studies, namely, that the CAT is not able to identify significant differences in the pretest-posttest raw scores of freshman students in developmental reading.

Two weeks before the end of the fall semester (1981), we presented five postcloze tests with 60 elisions in each test for the disciplines of English, mahematics, American history, sociology, and psyhology. We obtained the basic college text in each of the beginning courses of the five disciplines and determined readability levels for each text computed by both the Fry and the Dale-Long formulas. With the exception of the mathematics textbook (ninth grade level), all textbooks had readability levels of college textbooks.

The postcloze test procedures were administered to all the students in the developmental reading classes in this manner: (a) From the list of 227 freshman students in Developmental Reading, students' names were randomly placed into one of five categories: English, mathematics, American history, sociology, or psychology. (b) Each student was presented a sealed envelope with his or her name and social security number on the envelope. Clipped to the envelope was a xerox copy of a page from a textbook from which the cloze test in each envelope was taken. (c) Each student was asked to fill in each blank (60 elisions) with the word which was missing or the most appropriate word. (d) When each student finished reading the criterion text in his category, he or she was to raise a hand, and the passage would be picked up by the examiner. The student would open the envelope and complete the postcloze test without time restraints.

The table listed below contains the number of students in each category, the average postcloze score, the highest and lowest postcloze score, and the range of scores in each category.

Table 1

POSTCLOSE TEST MEAN SCORES AND RANGE OF SCORES IN EACH OF FIVE CATEGORIES OF DISCIPLINES

Category	N	Mean Score	Standard Deviation	High Score	Low Score	Range
English	44	25.1	7.7	40	4	36
History	44	22.8	10.4	48	3	45
Mathematics	44	23.7	8.1	39	10	29
Psychology	44	27.0	5.9	39	9	30
Sociology	44	33.9	9.3	53	13	40
Total	220	26.5		53	3	50

Three classrooms in beginning courses in each of four disciplines were selected. (We were unabe to obtain test data in the Sociology classes in the Fall of 1981.) No attempt was made to obtain random samples of classrooms because it was difficult to obtain permission for testing so late in the semester. Students were asked to open their textbooks to the criterion passage and to read it. When students completed the reading, they were to close their textbooks and complete the cloze test for the criterion passage. No student who had taken a postcloze test in Developmental Reading was permitted to be tested again. Table 2 contains the data from responses of students in each of four disciplines.

Table 2

MEANS AND RANGE SCORES OF RESPONSES BY FRESHMAN STUDENTS ON POSTCLOZE TESTS IN FOUR DISCIPLINES

Category	N	Mean Score	High Score	Low Score	Range
English	92	31.5	51	16	35
History	90	30.3	49	6	43
Mathematics	105	33.5	54	15	39
Psychology	115	32.3	47	12	35

Postcloze tests are administered after the reading of a passage from which the deletions are drawn; postcloze tests are similar to achievements tests. *Pretest cloze* procedures depend upon general background knowledge of the subject and upon his ability to utilize the redundancy inherent in language. They correlate relatively high (in the 70's) with standardized tests of intelligence (Taylor, 1957); Bormuth (1968) reported correlations in the 80s.

The postcloze test procedure, which was used in this study, provides a level of functioning specific to reading material in a particular classroom; therefore, it offers opportunities to measure reading abilities adjusted to functional criteria. In many developmental studies programs, there is a greater concern for *remedial* reading than for *developmental* reading. Remedial reading is more focused on improving general abilities in reading and correcting weaknesses in vocabulary and word attack skills. Developmental reading is aimed at improving reading abilities but is more directly concerned about the student's ability to comprehend concepts and meaning of words in specific courses and disciplines. Above all, in developmental reading there is the primary concern to protect the self concept of each student with any kind of deficit or disability. For college students it means making a student feel challenged to succeed with college materials without feeling that he is in fourth grade, or sixth grade, or eighth grade reading. Students in developmental studies must not feel relegated to an earlier stage of education.

Responses by students in Developmental Reading in this study appear to be much lower than responses of the general student body taking courses in the disciplines. Students in Developmental Reading classes had significantly lower average scores on postcloze tests in four disciplines (English, American history, mathematics, and psychology) than students in general education courses in the disciplines.

When the arbitrary criterion of 50 percent of the total elisions was applied, four of the five groups in Developmental Reading fell below the criterion measure. In the general education courses, however, all of the four groups tested scored at or above the 50 percent criterion.

The relatively large variance of the postcloze scores in the Developmental Reading classes raises the serious question of the ability of a number of freshmen students to read, with comprehension, the basic texts in the courses of five disciplines. After one semester of Developmental Reading, a large number of students are not ready to do college work.

Although the students with extremely low reading scores are permitted to register for developmental studies, it is highly improbable that students with such reading deficits can master the curriculum reading material in a reasonable amount of time. If students with extremely low ACT scores in English and on reading measures are successful in the freshman year, it is due to some personality or cognitive factors which have not been identified in reading research. It is gratifying, but it is unique. The serious question for administration of our Title III program is what criterion measure(s) will we use to predict that students can make up their developmental lag in a semester or two and complete a four-year degree.

We are generating hypotheses, here, not testing them. In the Spring of 1982, we hope to look at pre and postcloze tests, general ability measures, Degree of Power in Reading, attitudinal measures, and personality profiles.

USING A THEMATIC ORGANIZER TO DEVELOP CONCEPTUAL COMPREHENSION IN FOURTH, FIFTH, AND SIXTH GRADE REMEDIAL READERS

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Students with reading difficulties often are unable to comprehend major concepts of content materials. Comprehension problems may be the result of the instructional strategy, limited scope of comprehension questions asked by the teacher (Guszak, 1972), or abstract concepts which are not defined in the text (e.g., Pearson & Johnson, 1978). An inspection of social studies texts by these researchers revealed that thematic concepts were often implied or ill-defined.

Schema theorists suggest that providing and extending background experiences and knowledge prior to reading may enhance the readers' comprehension of difficult and/or abstract concepts. Several studies have verified that a statement of theme presented prior to reading increases comprehension for the passage (Bransford & Johnson, 1972; Dooling & Lachman, 1971). Pearson, Hansen and Gordon (1979) found that developing a schema for the content of a text resulted in significantly

better performance on textually explicit and implicit questions. Omanson, Warren and Trabasso (1978) also found in their work with five and eight year olds that children are able to make inferences but often lack prior knowledge to draw inferences as related to a selected situation or content of a passage.

Many forms of prereading activities or pre-organizers have been used to develop prior knowledge to aid reading comprehension. Advance organizes (Ausubel, 1960, 1968), structured outlines (Glynn & DiVesta, 1977), structured overviews (Barron, 1969) and thematic titles (Adams, 1977; Adams & Collins, 1977; Bransord & Johnson, 1972; Dooling & Lachman, 1971) are some of the strategies reported to increase reading comprehension.

The role of prior knowledge seems to be essential when the reader is required to interpret implied and/or difficult concepts. For comprehension to occur, the reader must be able to integrate new information into the knowledge already possessed. Therefore it is presupposed that the instructional strategy should extend the students' prior knowledge to develop a "cognitive readiness" for the new information presented in the text.

The purpose of this study was to investigate whether an instructional strategy could aid poor readers' comprehension of an implied concept by makingit more explicit. The instructional strategy incorporated the use of a reading guide or a thematic organizer, which the student read prior to and during the reading of the text. The thematic organizer was used to expand the readers' prior knowledge by defining the implied thematic concept of a social studies passage and presenting examples of that concept which were thought to be relevant to the reader. In a study with a group of average readers, Alvarez (1980) found that the use of a thematic organizer aided literal and inferential comprehension of a thematic concept in a social studies passage.

The researchers attempted to answer several questions in this study. Would the provision of background information on the implied thematic concept enhance the ability of poor comprehenders to discuss and/or explain that concept after reading a social studies passage? Specifically: (a) Would poor comprehenders benefit from this instructional strategy as assessed by their ability to retell the literal and implied information presented by the author? (b) Would poor comprehenders increase their ability to retell the literal and implied information presented by the author? (b) Would poor comprehenders increase their ability to answer literal and inferred questions on the passage? (c) Could students use the information presented in the thematic organizer to aid their ability to discuss and elaborate upon the literal and implied information of the text?

METHOD

Subjects

The sample for this study was twenty-four fourth, fifth, and sixth grade students who were referred to the Child Study Center of the Kennedy Research Center of Peabody College of Vanderbilt University. These students had been classified as "below average" readers by their referring classroom teachers. The Child Study Center provides multidisciplinary diagnostic and intervention programs. An after school remedial reading tutorial program is one function of the Child Study Center. School-age students are referred to the remedial reading program by parents, classroom and/or resource teachers and psychologists in the community.

Procedure

At the beginning of the tutoring program all children were tested on the *Gilmore Oral Reading Test,* Form C, 1968. All students were stratified according to grade level and performance on the Gilmore reading comprehension subtest and then randomly assigned with replacement to either the experimental or comparison group. There were approximately the same number of girls and boys in each group. Students were tutored in either a one-to-one or one-to-two setting. The nature of these pairings was equivalent across the experimental and comparison groups.

The eighteen tutors for the study were pre-service teachers enrolled in an advanced undergraduate reading methods course entitled "Remedial Reading and Practicum." All tutors completed the course before the study was implemented. The tutors were randomly assigned with replacement to the experimental or comparison group. Neither the students nor the tutors were aware of the nature of their group placement.

A script for the teaching procedure was provided for each group of tutors. Each set of tutors were taught to follow the script during two training sessions. During the interventions, tutors were observed (through one-way mirrors) by external evaluators who found little or no deviation from the script, with a reliability estimate of .98. A three week period was used for this study. There were two remedial sessions each week with a two day delay evaluation following the sixth session. The data collected on the sixth session and the two day delay were analyzed for this study. All students were pretested on four concepts including the concept presented in the sixth session, four weeks prior to the commencement of this study. No student was able to define or discuss any of these concepts.

The tutors in each group followed a different set of procedures. The tutors in the comparison group were given a set of prereading questions and the passage which included its title. The prereading questions required the students to discuss literal information presented in the text and predict the meaning of the title and/or implied thematic concept of the passage. Students were asked to read the passage to answer these prereading questions or confirm their predictions.

In the experimental group, the tutors utilized the thematic organizer and the passage with the title included. The students were asked to read the thematic organizer prior to reading the passage, write their prediction statements and respond to the statements during or after reading the passage. They were told that they could refer back to the thematic organizer at any time as they read.

Following the reading all students were asked to retell what they read and answer ten questions (5 literal and 5 inferential). All responses were tape recorded and then typed as verbatim scripts by the tutors. For the comparison group, the time each student used to read the passage was recorded. Time for reading the thematic organizer and passage was recorded for each student in the experimental group.

During the study, several variables were held constant. Each tutor of both groups received equal conference time with the supervisor. All tutoring sessions were held under the same conditions (e.g., number and time of sessions, size of tutoring rooms, amount of observation time).

Materials

A set of social studies passages were collected from fourth and fifth grade textbooks. All passages contained an implied thematic concept which was judged to be a factor influencing the difficulty level of the passage. Six expository passages were randomly selected from this set to be used as instructional materials (see references). Each passage contained the mean length of 525 words. All texts were different from the one being used in the students' classroom.

A thematic organizer was written by the investigators for each passage using the procedure developed by Alvarez (1980). Each thematic organizer contained these components:

a) three paragraphs which introduced the concept to be studied and cited examples of the concept relevant to the students' experiences.
b) two sentences which contained the concept. Directions required students to explain the sentences by restating them in their own

words.

c) a set of 6 or 7 sentences which contained plausible and non-plausible information about the passage. Students were to indicate whether they agree with the statements during and/or after their reading.

Five literal and five inferential comprehension questions were written for each passage by a group of reading specialists. These questions followed the students' retelling. The inferential questions were devised so that none of them could be answered by reading only the thematic organizer. Inferential questions required students to use information presented in the passage.

A passage entitled "The Reformers" from a fifth-grade text was selected for the sixth session. The title of the passage presented the implied concept which was not defined in the passage. The passage, which had 509 words within 39 sentences, was parsed into 57 idea units using the method described by R. E. Johnson (1970). Interrater reliability was .97. Idea units were rated for structural importance (interrater reliability of .97) to identify the least to most important units. Structural units were analyzed for action vs. description content. The division of these were relatively equitable across the four levels. It was determined that differential recall of these units would be relatively uncontaminated by the distribution of the factors. Also, each of the four levels of structural importance occurred approximately equally often in each section of the text. Therefore it was assumed that recall of important units was not contaminated by primacy or recency effects.

ANALYSIS

After students completed their reading, each was asked to retell the passage and respond to five literal and five inferential questions. Scripts of students' retellings were typed and divided into idea units. Independent raters classified student responses as literal or inferred. Restatements of the information presented on the thematic organizer were coded separately and not analyzed with these data. All protocols were scored according to the degree to which they preserved the meaning of the original textual units (interrater reliability was .91). This scale was used:

3—if the subject's idea is a verbatim recall or good paraphrase of the original unit.
2—if the subject's idea unit is a verbatim recall or good paraphrase of a major part of the original unit.
1—a somewhat vague paraphrase or only a small fragment of the original unit.
0—incorrect response, no text related information.

Responses were also categorized according to their level of structural importance on a scale of 4 to 1. Responses to questions were evaluated as correct or incorrect by independent raters (interrater reliability was .94).

A two-way ANOVA with two factors (groups and trials) with one repeated measure over trials was used. The results indicated the following:

Literal retellings—Significant differences were found among group means for literal comprehension across groups and trials, $F(1,22)=5.49$, $p < .03$ (Combined means for trials 1 and 2 were: Group A, experimental=15.04 and Group B, comparison =8.96). A one-way ANOVA indicated no significance at Trial 1.

Inferential retellings — Significant treatment effect for responses at inferential level across groups and trials, $F(1,22)=19.46$, $p < .001$ (Combined means on repeated measures were: Group A, experimental=6.08 and Group B, comparison=0.50).

Literal questions — Significant differences were found among group means on inferential questions across groups and trials, F 91,22)=92.57, $p < .001$ (Combined means on repeated measures were: Group A, experimental=3.58 and Group B, comparison =0.62).

Inferential questions—Significant differences were found among group means on inferential questions across groups and trials, F91, 22)=92.57, p× .001 (Combined means on repeated measures were: Group A, experimental=3.58 and Group B, comparison=0.62).

Total questions — Significant differences were found among means on inferential questions across groups and trials, $F(1,22)=75.65$, $p < .001$ (Combined means on both trials were: Group A, experimental=6.08 and Group B, comparison= 1.58).

No interaction occurred for time indicating that time was not a factor related to different performance between groups.

Secondly, the data were analyzed to determine whether the groups differed in their ability to recall structurally important units or preserve the meaning of the literal ideas. Since the experimental group was "primed" on inferred information, it was presupposed that these students may overlook literal ideas as they read to understand the implied concept. As noted above, the experimental group performed significantly better on literal comprehension than the comparison group. The analysis of the groups' performance also indicated that the experimental group recalled more of the most important idea units (4's and 3's). The percentage of most important idea units recalled by students in Group A (experimental) was 63% and 62% on Trials 1 and 2 respectively and for Group B, (comparison), 44% and 29% on the same trials. More than half of the responses given by Group B were of least important idea units.

An interesting finding was also noted when students' idea units were compared for the degree to which they preserved the meaning of the original passage units. Students receiving the treatment recalled more complete propositions than students who were in the comparison group. Responses of students in the experimental group were rated as having high meaning retention and completeness. In trial 1, 94% of responses given by students in Group A and 68% of responses given by students in Group B were rated as 3 (complete restatement) or 2 (nearly complete restatement). On Trial 2, a difference also occurred; 68% of responses of Group A and 58% of responses in Group B were rated as a 3 or 2.

DISCUSSION

Students' performance on literal and inferential recall was influenced by the framework in which they were encouraged to place the events of the passage. Students used pre-existing knowledge (information about reformers) to elaborate on the implied concept of the text. The orienting nature of the thematic organizer seemed to encourage the reader to produce more important structural units and more complete and meaningful restatements of the propositions within the text and not just attend to the implied information discussed in the adjunct aid.

This study also indicates that the extent to which a textual passage is comprehended is not exclusively dependent upon the reader or the text itself. Instead, the study suggests that certain aspects of reading comprehension may be positively influenced by such factors as the type of organizer given prior to and along with a textual reading.

REFERENCES

Adams, Marilyn Jager. "Failure to Comprehend and Levels of Processing in Reading." Technical Report No. 37, ED 145 410, April 1977.

Adams, Marilyn Jager and Allan Collins. "A Schema-Theoretic View of Reading." Technical Report No. 32, ED 142 971, April 1977.

Alvarez, Marino C. "The Effect of Using an Associate Passage with Guided Instruction to Evoke Thematic Conceptual Linkage." Unpublished Doctoral Dissertation, West Virginia University, 1980.

Ausubel, David P. *Educational Psychology: A Cognitive View*. New York: Holt, Rinehart and Winston, 1968.

Ausubel, David P. "The Use of Advance Organizers in the Learning and Retention of Meaningful Verbal Material." *Journal of Educational Psychology*, vol. 51, no. 5 (1960), pp. 267-272.

Barron, Richard F. "The Use of Vocabulary as an Advance Organizer." In H. L. Herber and P. L. Sanders (Eds.). *Research in Reading in the*

Content Areas: First Year Report. Syracuse, New York, Syracuse University Reading and Language Arts Center, 1969, pp. 29-39.

Bransford, John D. and Marcia K. Johnson. "Contextual Prerequisites for Understanding: Some Investigations of Comprehension and Recall." *Journal of Verbal Learning and Verbal Behavior,* vol. 11, (1972), pp. 717-726.

Dooling, James D. and Roy Lachman. "Effects of Comprehension on Retention of Prose." *Journal of Experimental Psychology,* vol. 88, no. 2. (1971), pp, 216-222.

Glynn, Shawn M. and Francis J. DiVesta. "Outline and Hierarchical Organization as Aids for Study and Retrieval." *Journal of Educational Psychology,* vol. 69, no. 2 (1977), pp. 89-95.

Guszak, F. J. *Diagnostic Reading Instruction in the Elementary School.* New York: Harper & Row, 1972.

Johnson, Ronald E. "Recall of Prose as a Function of the Structural Importance o the Linguistic Units." *Journal of Verbal Learning and Verbal Behavior,* vol. 9 (1970), pp. 12-20.

Omanson, R. C., W. H. Warren, and T. Trabasso. "Goals, Themes, Inferences, and Memory: A Developmental Study." Paper presented at American Educationaal Research Association, Toronto, 1978.

Pearson, P. David and Dale D. Johnson. *Teaching Reading Comprehension.* New York: Holt, Rinehart and Winston, 1978.

Pearson, P. David, Jane Hansen, and Christine Gordon. "The Effect of Background Knowledge on Young Children's Comprehension of Explicit and Implicit Information." Technical Report No. 116. Urbana, Illinois: Center for the Study of Reading, University of Illinois, 1979.

Passages Used in This Study:

Anderson, Lee F. General Editor. *Windows On Our World: The United States.* Boston: Houghton Mifflin, 1976.
Modern Technology Brings New Ways of Working, pp. 360-363.
The Newcomers Face Many Problems, pp. 300-303.
Indians Are Moved To The West, pp. 306-308.

Berg, Roger M. General Editor. *Social Studies: Grade Five.* Glenview, Ill.: Scott, Foresman & Co., 1979.
Independence for Texas, pp. 198-199.

Cherryholmen, Cleo, Gary Mansin, George Vuicich, and Joseph Stallman. *Understanding the United States.* New York: Webster Division, McGraw-Hill Book Co., 1979.
The Reformers, pp. 341-343.

King, Fredick M., Herbert C. Rudman, Herbert V. Epperly, and Ralph J. Cooke. *The Social Studies and Our Country.* Palo Alto, Calif.: Laidlaw Brothers, 1972.
Winning Economic Independence, pp. 330-332.

LITERARY VERSUS SCIENTIFIC READING IN COLLEGE—A COMPARATIVE ANALYSIS

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It is a commonly held belief that readers tend to use differing skills when confronted with "quantitative" or science materials that they use for "verbal" or literary articles. The natural inclination or bent of students usually attracts them to college majors which exploit and expand their native abilities. The seemingly unavoidable result of this predilection and training would be a specialized approach to reading matter on the types which may be thought of as scientific, or literary or non-scientific.

As long ago as 1938, Shores concluded that special skills were needed to effectively deal with historical and scientific reading materials. He argued that other areas of study did not need the same skills that science and history (names, dates, facts) seem to require. Twenty years later, Maney (1958) examined the differing skills necessary to successfully function in science material, but did not generalize to other content areas. Kaufman (1975) found that very specific skills seemed to be necessary for accurately processing reading material in the four major content areas of English, mathematics, history and science. He further stated that specific skills, such as critical reading, did not work equally across disciplines.

In the research recorded above the focus was on topics, fields of study, texts; in short on the content areas. Apparently, the efficient reader would need a large bag of skills in order to succeed in the many areas of study leading to a liberal education. We wondered what we would find if we shifted away from the content area, and focused instead on the student of that content.

The researchers decided to test the hypothesis that: 1) science majors read scientific text more effectively than literary material because of specialized skills demanded; 2) art majors likewise show different reading skills, but probably with opposite results in terms of proficiency, (i.e. the difference between their rate and comprehension favors literary material over scientific); 3) art majors, because of suspected aversion to the methodical scientific topics, show a greater difference between their scores on literature and scientific material than do science students; 4) there is a difference between the reading ability of arts and science students when each sex is considered separately. In short, the primary question was whether arts and science students differ in reading skills, not whether the content require different reading skills.

The Study

The subjects were 77 students enrolled in an Efficient Reading class at a large mid-western university. The breakdown was as follows:

GENDER		MAJOR
21 Females	Arts	Technical Communication, Family Social Science, Sociology, Social Work, History
9 Males	Arts	Pre Law, History, International Relations
30 Males	Science	Computer Science, Bio Science Agriculture
17 Females	Science	Animal Science

Available data included scores on the *Nelson-Denny Reading Test, Forms E and F.*

Twenty-three students were eliminated from the original pool of 100 because of first quarter freshman standing, non-categorizable major field, and/or incomplete data.

The first question was whether or not, considering majors and gender, students differed in terms of their reading skills. For both males and females we compared the sub-scales of the Nelson-Denny test for arts and science students. For the Arts female the average percentiles were Vocabulary 44.04; Comprehension 33.6; Total 39.8 and Rate 16.0. For the Female Science group the corresponding scores were 42.3; 36.8; 41.2; and 19. For the Arts males the average percentile were for Vocabulary 50.6; Comprehension 43.6; Total 47.6 and Rate 5.6. The Science males earned corresponding scores of 34.76; 28.5; 30.2 and 10.7. Each sub-scale was evaluated by ANOVA for main effects of gender and major (arts vs. science). There was only one significant finding, at $F=6.91$, $P < .05$. This was due to an interaction effect for the comprehension sub-scale. The mean for arts males (43.66) seems to be enough higher to produce the finding. We are inclined to dismiss the difference as of no importance.

The study itself was a comparison of scores for rate and comprehension obtained from reading two rather different articles included in an Efficient Reading textbook.

The literary selection was a charming short story titled "The Fifty-First Dragon," by Heywood Braun. The story has 3,000 words, and is rated 61 (standard) on the Flesch Reading Ease

Scale.

The scientific piece was an insightful and rigorous article by Herbert A. Otto called "New Light on the Human Potential," a 2,885 word discourse on neurological research, creativity and physical potential, which includes such terms as "Paranormal phenomena," "cerebral radio-communication," and "bioelectronics." The Flesch rating is 46, or Difficult.

The subjects read these selections during the first week of class, before any significant instruction had taken place, which is to say that Efficient Reading instruction had no effect on the scores.

The basic data, to test the hypothesis of specific skills for reading, was the size of the difference between reading scores for literature and science articles. We expected science students to demonstrate both higher rate and comprehension scores on the science material, and art students to earn higher scores on the literary material. That was not what we found. For both males and females the data showed that the literary passages were read faster, regardless of the reader's major. Comprehension was tested by a 10 item test following each story. The results were not so consistent. The males read the literary story with a higher comprehension, but females earned a high comprehension on the science articles. In no case, for either sex, for either article, did we find the cross-over mean differences we would have expected if students read the materials appropriate to their majors with greater speed or comprehension.

A third hypothesis had to do with the difference between scores for literary and science reading as a function of major. We expected that there would be a greater difference for art majors that would show up for science majors. Again, we did not find the expected separation. There were no significant differences, by t test, between literature and science Rate or Comprehension for males or females. The data are presented in Table 1.

Conclusion

Committed students, well into their major, do not seem to use different skills when doing different types of reading in the fields of literature or science.

In this study we found no significant differences between the performance of science and non-science students whether reading in or out of their special field. Nor, if formal training is used as an index (other than "formal" college reading training) does there seem to be need for any highly specialized skills not generalizable from content area to content area. Finally, we did not find important reading differences by sex. In this sample male art students tended to read slightly better. However, the sample was small and may be highly selected and not easily generalizable.

One of the limitations of the study was that the students enrolled in the Efficient Reading Course are, at least, average students. Students of lesser ability, or significantly greater ability may not exhibit the same traits. The limitations imposed by a small *n* will be rectified as time passes and the data pool grows.

REFERENCES

Brown, James I., J. Michael Bennett, Gerald Hanna, *The Nelson-Denny Reading Test, Forms E and F*. The Riverside Press, Iowa City, Iowa—1981.

David, Frederick, B. Psychometric Research on Comprehension in Reading. *The Literature of Research in Reading with Emphasis on Models*, F. B. David (Ed.) Isis Corporation, East Brunswick, N.J., 1971, pp. 8-3 to 8-60.

Kaufman, B. Darwin. "A Comparative Analysis of Reading Comprehension in Four Content Areas." The Yearbook of the National Reading Conference, 200-206, 1975.

Maney, E. Literal and Critical Reading in Science. *Journal of Experimental Education*, 27, 1958, 57-64.

Shores, Jr. The Ability to Read Historical Materials as Related to Eighth Grade Achievement and General Reading Ability. Unpublished Master's Thesis, University of Minnesota, 1938.

Wark, David and Michael Bennett. The Measurement of Test Anxiety in a Reading Center. *Reading World*, 20,3, March, 1981, 215-222.

MEAN-RATE AND COMPREHENSION DIFFERENCES BY SEX FOR ARTS AND SCIENCE STUDENTS READING LITERATURE AND SCIENCE MATERIALS

	MALE		FEMALE	
	ARTS N=9	SCIENCE N=30	ARTS N=21	SCIENCE N=17
READING MATERIAL	**WORDS PER MINUTE**			
LITERATURE	351.0	320.0	343.47	330.29
SCIENCE	338.3	304.8	335.9	328.1
Difference	12.66	15.23	7.52	2.176
	t=.08		t=.126	
READING MATERIAL	**PERCENT CORRECT**			
LITERATURE	71.7	71.6	74.7	83.8
SCIENCE	73.3	72.6	69.0	71.2
Difference	2.2	1.0	5.7	12.38
	t=.142		t=1.52	

EFFECTS OF COMPUTER-AIDED GLOSSING ON PROSE RECALL

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Merging glossing with computer-aided instruction seems natural for directing readers' use of skills and strategies to comprehend and remember information from text. Glossing, as an instructional technique for actively involving students in the process of reading, has been developed to increase readers' attention to places in text where the application of specific skills and strategies—such as parphrasing and monitoring comprehension—would be appropriate for deriving meaning from expository material (Otto, Whie & Camperell, 1980). And results of pilot investigations with classroom students have been encouraging (see Otto, White, & Camperell, 1980, for detailed results of pilot studies and subsequent investigations and for examples of "glossed" materals). To date, however, gloss notations have been constructed on paper for use with groups of students—not indiviuals. To truly individualize this procedure, another method of glossing needs to be explored and refined. What is needed is a system which allows the learner to determine when a particular gloss notation is necessary and then to activate just that gloss to direct comprehension.

Computer-aided instruction could provide the flexibility necessary to allow learners to monitor their levels of comprehension while reading and activate at will specific skills and strategy glosses for interacting meaningfully with text. Computer-aided instruction is designed to provide instant service to the learner (i.e., activating and receiving a specific gloss notation). The computer has infinite patience so the learner may process the text at a comfortable rate. Also, since the organization of the courseware is determined by the teacher, gloss notations can appropriately reflect that teacher's expectations for the assigned reading. The ultimate goal for this line of research would be to develop an independent text-authoring system for computer-aided glossing that can be programmed for use by classroom teachers with little or no programming experience (Blohm, in progress). At the present, however, a prototype system has been developed that can be used with college students who have regular access to computer terminals to both direct students' prose learning and to research treatment effects on that learning.

For this initial investigation, the following questions were generated. First, would the students who are provided the opportunity to activate gloss phrases while reading on the computer recall more information than those who are not provided with the gloss paraphrase option? Second, would the number of gloss paraphrases activated influence the quantity of recall? And third, would those opting to activate gloss paraphrases while reading take significantly longer to complete the reading than those not offered the option?

Method

The design of the study was a 2×2 factorial with eighty college undergraduate Education majors. Each student was randomly assigned to one of the four experimental groups. The first factor was the topic of reading selection which was either heat flow or electrical conductivity. The second factor was the type of treatment which was either reading with glossed paraphrase notations or without gloss paraphrases. The treatment selections for the experiment were the "abstract" versions of two pssages used in Royer and Cable (1975). The length, in words, of the heatflow selection was 780 and 672 for the electrical conductivity selection. These selections were then programmed in PL/1 computer-language as the text content for the computer-aided courseware used in this experiment. A gloss paraphrase/no-gloss paraphrase option was included for both selections in the "control" file of the courseware program to automatically arrange the sequencing of the selection and treatment in the experiment. Also included in the courseware were separate "gloss-direction" and "no-gloss-directions" files to guide and direct subjects through the assigned treatment and a record-keeping "dump-statistics" file to store each subject's activation of gloss paraphrases by page and sequence and reading rates-per-page for subsequent analysis. (See Blohm, in progress, for detailed description and examples of the courseware program.)

The subjects were run in groups ranging in size from one to five. They were instructed by their respective directions to read their assigned text for the purpose of recalling as much information given as possible. These directions explained that no screen pages could be reread after they signalled for a new page. The gloss paraphrase treatment directions for the two selections instructed those assigned subjects to activate *all*

gloss paraphrases they felt would be necessary for helping them recall the text content. At the same time, however, they were encouraged to activiate *only* those glosses that were really necessary. In contrast, the no-gloss treatment directions for the two selections simply explained to those subjects assigned that no more than eight lines of text would appear on the terminal-screen page at any one time. Following the separate introductory statements and procedures for the two treatments, all subjects were instructed in the courseware to read the treatment selectin on the terminal using the assigned technique at their most comfortable reading rate. No time limits were imposed for reading. After they finished their assigned selection,t the subjects were asked to write down, in complete sentences, everything they could remember from their reading. They were allowed as much time as they desired for completing this recall task. A graduate assistant who was naive to the purposes of the experiment scored each of the recall protocols against a list of "idea units" established in Royer and Cable (1975).

Results and Discussion

Results of the study indicated that the group which received the reader-activated gloss paraphrase option on the computer for the heatflow selection recalled more idea units on the free recall measure ($\bar{x} = 18.57$) than any of the other three groups (gloss/electricity—$\bar{x}$=16.15, no-gloss/heatflow—$\bar{x}$=12.21, no-gloss/electricity—$\bar{x}$=7.15). Both groups receiving the reader-activated gloss option recalled more idea units than did the groups not receiving the gloss option, regardless of selection read. Results of an analysis of variance indicated that the differences were significant between the mean idea units recalled by the two treatment groups ($p < .000$) for both selections. No significant differences were found for the interaction between treatment and selection ($p < .007$). Further analyses indicated that no significant correlation existed between the number of gloss paraphrase activated and the number of idea units recilled for either selection. Evidently, the *number* of gloss paraphrases activated by students in the gloss option treatment while reading did not increase the quantity of their recall. Finally, results of T-tests indicated that no significant differences existed between the two treatment groups in terms of time spent reading ($p < .000$). The mean reading time was 12.1 minutes for the gloss group and 10.32 for the no-gloss group.

An apparent interpretation for the significant treatment effect found for offering optional reader-activated gloss paraphrases while reading is that the technique facilitated recall. The gloss paraphrase, when activated by the student during reading on the computer, might have activated the student's immediate comprehension by providing restatements of the text which more closely matched that student's prior knowledge and experience. That no significant correlation existed between the number of glosses activated and amount of recall may have been due to the comprehension-monitoring ability of the student which was promoted through the computer-aided treatment. Since the student was encouraged through the gloss paraphrase option to decide regularly while reading if the knowledge structures in the selection were being effectively encoded for later retrieval, the number of gloss paraphrases activated would depend on his or her prior experience with the knowledge contained in the selection. In addition, one activated gloss paraphase might have had a facilitative transfer effect for understanding other segments of the original text. Hence, the inclusion of the reader-activated gloss paraphrase option may have encouraged the student to not only monitor comprehension in terms of previous experience and learning but also in terms of actively relating earlier segments of text learning to later segments—an important metacognitive skill (Brown & Deloache, 1978; and Yussen, Mathews, & Hiebert, in press). Since the number of idea units contained in the two selections were not equal (i.e., heatflow=67, electricity=52), the significant difference found between the two selections was to be expected. That both selections were significantly better recalled by the reader-activated gloss option group substantiates the overall effectiveness of the treatment.

While no statistical differences were found for time spent reading, educationally, the gloss treatment group did spend 15 percent longer reading than did the no-gloss group. Over a longer reading assignment, the number of minutes spent might make quite a difference. Still, the results do suggest that implementing the computer-aided gloss treatment would not severely impinge on teachers' classroom instruction time. However, more testing with this treatment will be necessary before any educationally profitable conclusion may be drawn about the effects on time.

The results and interpretations of this investigation provide the foundation for further research and development of the computer-aided gloss option technique for ultimate implementation and experimentation in the classroom. Data from this experiment should first be reanalyzed for qualitative effects—depth of processing—as well as quantitative effects. Then replications of the experiment should be conducted to increase the data-base for examining the effect of a particular activated gloss on the depth of processing exhibited in the recall of knowledge structures paraphrased to explain the effect of the activated gloss paraphrase. Incorporating additional features (e.g., backpaging, reverse-image highlighting) in the courseware as well as promoting more comprehension skills and strategies (e.g., noting details, seeing author's organization) in the reader-activated gloss notations may further improve students' comprehension of text. The future for the use of such courseware in the classroom is very encouraging. This study and related investigations are viewed as my attempt to capitalize on the use of the computer in the classroom for promoting reading skills and metacognitive strategies to facilitate students' ability to learn from text.

REFERENCES

Anderson, T. H. Study strategies and adjunct nids. In R. Spiro, B. Bruce, & W. Brewer (Eds.), *Theoretical issues in reading comprehension.* Hillsdae, N.J.: Lawrence Earlbaum Associates, 1980.

Baker, L., & Brown, A. L. Metacognitive skills of reading. In D. Pearson (Ed.), *Handbook of reading research.* New York: Longman, in press.

Blohm, P. J. *Development of the COMPU-GLOSS System for creating computer-aided gloss courseware.* Lafayette, Louisiana: University of Southwestern Louisiana, in progress.

Brown, A. L. & DeLoache, J. S. Skills, plans, and self-regulation. In R. S. Siegler (Ed.), *Children's thinking: What develops?* Hillsdale, N.J.: Lawrence Erlbaum Associates, 1978.

Otto, W., White, S., & Camperell, K. *Text comprehension research to classroo application: A progress report* (Theoretical Paper No. 87). Madison: Wisconsin Research and Development Center for Individualized Schooling, 1980.

Royer, J. M., & Cable, G. W. Facilitated learning in connected discourse. *Journal of Educational Psychology,* 1975, *67,* 116-123.

Yussen, S. R., & Mathews, S. R. & Hiebert, E. Metacognitive aspects of reading. In W. Otto & S. White (Eds.), *Reading expository material.* New York: Academic Press, in press.

RSM2P: A META-COGNITIVE APPROACH FOR TEACHING COGNITIVE STRATEGIES TO FACILITATE LEARNING

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Our concern, in this paper, is with a very specific type of *learner*. The emphasis on "learner" is intentional. We are convinced that the student we are going to describe is not a "non-learner," "poor learner," "remedial learner," or any of many other labels this student has worn through educational history. A quote from Smith (1982) expresses our position on the ability of this learner to learn.

> ". . . brains learn all the time. This is what brains are, organs for learning. Brains do not have to be provoked into learning or rewarded for learning any mre than the lugs need a stimulus for breathing. Lungs breathe, that is their function, and lungs that do not breathe are dead lungs. Children learn all the time—this is the time bomb in every classroom. Children learn, though not perhaps what we think or hope we are teachn them. The question should not be "Why don't children learn?" but "What do children learn?"; "What do we teach them in school?"
>
> A child's brain walks a narrow line between boredom on the one hand and confusion on the other, and as a result, children learn all the time. Children will not willingly get themseves int boring or confusing situaions." (p. 12)

The "impulsive responder" is a learner who avoids the confusing situations; or more accurately, eliminates the confusing situations. In other words rather than accept that a given problem solving task (e.g. finding the main idea, recognizing sequences, etc.) is either too diffiult or that he/she is not sure how to solve it, the impulsive responder simply perceives a different task—one that he/she has learned to solve (remember Smith's description of the learning brain).

Any elementary teacher, secondary resource teacher, or reading specialist is familiar with the impulsive responder—the student who frustrates us when we attempt to determine a pattern of responses in order to prescribe an appropriate educational program. Our response is usually that there is no pattern—that the student does not appear to be using any strategy other than guessing.

However, our work indicates that the student is using a strategy—to solve a problem—but, his/her perception of the problem is not the same as the teachers. The teache may perceive the problem as identifying the main idea, stating the main character, etc., etc.; however, the student perceives the problem as reducing the amount of time he/she must be the focus of attention. The impulsive responder solves the problem—efficiently. He/she uses a strategy, and that strategy works.

Rememer Frank Smith's "learning brain"! How did the impulsive responder learn the strategy, and how did he/she learn to perceive the problem differently? For the teacher there may be many different problem, but for the impulsive responder the problem is always the same—relief from the focus of attention.

Traditionally Kindergarten and First Grade teachers reinforce participation. One of their tasks seems to be to teach the child to socialize, to become part of the group. They do it beautifully! The child is praised for participating. In many cases responding appears to be more important than the response. The following dialogue, although a product of our imagination, is not unrealistic.

> The first grade class has just completed reading a humorous story about an animal who is always getting into trouble. The teacher asks, "Johnny, what kind of animal is the story about?" Johnny quickly replies, "A dog." The teacher smiles and acknowledges, "That's nice, Johnny; there was a dog in the story." Johnny received social reinforcement for his response and is proud—but, the teacher turns to Sally and comments, "But, what animal was the story *about* Sally?" Sally replies, "An elephant." The teacher exclaims, "That's good!" and goes on to the next question.

Johnny is bright enough to know that an elephant and a dog are not the same. He also knows that what he said was "good." Thus, what he learns is to *answer*.

However, as Johnny gets older he finds that he does not always receive praise for his responses; in fact, sometimes his peers laugh and the teacher seems to be upset. In third or fourth grade he begins to wonder why his answer is seldom like the "correct" one. He even pauses when called upon—not really wanting to answer. This behavior irritates the teacher—it slows down the lesson. His classmates think that he is slow. Finally, he reinstitutes his old strategy, slightly modified. He replies simply "I don't know." The lesson moves swiftly and the attention is not focused on the impulsive responder.

The impulsive responder becomes characterized as unmotivated and/or distracted. Parents and teachers are convinced that he never attempts to prepare for class or does his homework. In junior high and high school he may even utilize detractors (being the class clown or wise guy) to facilitate his removal before the task is presented.

We feel that the impulsive responder really does not know how to solve the problem. In the beginning the "correct" problem was not perceived. When reinforcement for responding ceased, the learner suffered confusion and reverted to the original strategy to avoid the confusion.

In our program we teach strategies for solving a given problem, or thinking through a task. The emphasi here is on "thinking through" a task. We have found that by teaching these learners some very specific steps for "thinking through" a task, they can be successful (Huhn, 1977). However, we have also found that the method used in teaching the strategy is equally as important as the problem solving strategy. The strategy the learner is taught is a cognitive strategy; the method used in teaching the strategy is a metacognitive approach.

Where do we get the strategies we teach? As suggested by Meichenbaum (1982), we engage in introspection. We perform the task and note what we think, what we do, and what influences our decisions. Next, we look over our notes and develop sequential steps while adhering to two criteria: (1) enough steps to maximize the probability of success, and (2) not so many steps that the strategy is confusing. Cognitive strategies can be developed for any problem solving task. We currently have over thirty strategies for tasks in reading, writing, and mathematics.

Once the strategy is developed, the next step is to teach the learner how to use it. The important thing to note here is that we *do not* "teach the strategy," but rather, we teach the student "how to use the strategy." Memorizing some steps in a procedure would probably be another task that would frustrate the impulsive responer; however, learning how to "think through" a problem should relieve some of the frustration and confusion the impulsive responder has felt.

We have called our procedure for teaching cognitive strategies RSM2P: Rationale, Steps, Model, Practice (aided), and Practice (independent). This procedure is used to teach any cognitive strategy.

Rationale. We feel that it is important that learners know what they are being taught and why. This seems to be especially true for those learners who have not been academically successful. Therefore, we begin by discussing the purpose of the strategy and how using it is intended to help the learner.

Steps. Next, we provide the learner with the steps of the specific cognitive strategy in writing. We also go over each step orally to clear up any confusing vocabulary or wording.

Model. This is an extremely important step. The teacher uses the strategy to perform a task—"thinking out loud." That

is, the teacher models the use of the strategy while vocalizing the thinking and decision making process. Thus, the learner can see and hear how to perform the task and become aware of how the thought process monitors the performance of the task.

Practice (aided). This time the student uses the strategy to solve the problem while "thinking out loud." The teacher assists the "thinking process" by reinforcing accurate student decisions and guiding the student to the correction of faulty decisions.

Practice (independent). Finally, the student is given a number of similar tasks, as determined by the teacher, to determine if learning the stratey has affected more accurate performance. Since the student is performing silently, it is no longer possible to observe if the student is using the strategy as written. However, that is not important. If the student is accurate, it does not matter if he/she has modified (personalized) the strategy. If the student is not accurate, then more modeling and practice is needed.

In conclusion, we have found that the impulsive responder does not appear to know how to begin to problem solve or to think through a task. Thus, by teaching cognitive strategies using a metacognitive approach, the impulsive responder is provided with a specific strategy for solving a problem and a model for using "thinking" to monitor his/her performances.

REFERENCES

Huhn, R. H. A study of the effect of reading-learning skills instruction on failure in nursing. Unpublished doctoral dissertation, University of Missouri-Kansas City, Kansas City, Missouri, 1977.

Meichenbaum, D. Teaching thinking: A cognitive-behavioral approach. *Interdisciplinary Voices,* No. 2. Austin, Texas: Society for Learning Disabilities and Remedial Education, 1982.

Smith, F. How children learn. *Interdisciplinary Voices,* No. 1. Austin, Texas: Society for Learning Disabilities and Remedial Education, 1982.

CLOZE PERFORMANCE OF SIXTH GRADE STUDENTS ON FICTION, SCIENCE, AND SOCIAL STUDIES

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Since introduction of the cloze procedure (Taylor, 1953), it has been widely researched and discussed as a diagnostic procedure, in ascertaining readability levels, and as a teaching procedure to improve comprehension (Boyce, 1974; Boyce 1976). Jongsman (1971), surveying the research, concludes that the procedure "correlates substantially" with multiple choice and standardized measures of reading comprehension. Hicks (1979) found no differences in mean scores when testing second through sixth grades with cloze passages and an informal reading inventory while Davidson (1980) found a weak relationship between informal reading inventory and cloze performance on science and social studies passages.

Comparisons of students' performance through the cloze procedure have been conflicting as to the relative difficulty of the content areas. Dodd (1973) found eighth-grade students' scores in literature to be significantly higher than scores in science and social studies. These latter two did not differ significantly, except for the below average group whose scores in social studies were significantly lower. Cohen (1975) compared the cloze performance of seventh-grade good readers on literature, science, and social studies passages. These students performed best on social studies and poorest on literature. Davidson (1980) tested fourth- and sixth-grade students on cloze science and social studies passages. Fourth-grade students scored significantly higher on science while sixth-grade students scored higher on social studies passages. Comparison of cloze performance in the content areas has been limited to predominantly white groups. This study is designed to further explore students' performance on cloze passages in the content areas of fiction, science, and social studies.

THE STUDY

Subjects

The subjects in the study were sixth-grade students enrolled in a predominantly black middle school with an approximate ratio of 60 percent black and 40 percent white, in Madison County, Alabama. The school selected was representative of the population of middle schools in the geographic area of the city in which they were located. The purposive sampling technique was used to select six hetereogeneous classes.

Materials

Cloze passages in fiction, science, and social studies were taken from *The Contemporary Classroom Reading Inventory* (Rinsky & de Fossard, 1980). Cloze passages are provided in these content areas at grade levels four through nine. The Harris-Jacobson Readability Formula (Harris & Sipay, 1975) was used to establish grade level readability.

The traditional procedure of deleting every fifth word was followed. Results in the study were based on thirty blanks for each passage. The following levels and percentage criteria are established in the *Inventory:* Independent, 57+; Instruction (Definite), 45-56; Instruction (Caution) 39-44; Frustration (Below 39). Based on an 83-student sample, a correlation of .94 is reported between performance on reading passages and the corresponding cloze passages.

Methodology

Students were tested during November, 1981 with all testing conducted by the researcher. Testing occurred in the morning from 8:30 to 9:30 a.m. on succeeding days for students being tested. Testing followed the format suggested in the *Inventory:* administering of a practice selection and administering of two selections on any one day for grades 6-9. All students were administered the fifth-grade fiction cloze passage as a practice passage.

Information from the manual for completing the passage was given to students before beginning the practice passage. Students scored their own practice selection during a brief discussion of appropriate choices. Immediately following this discussion, a cloze passage was administered. The remaining two cloze passages were administered the following day. Passage presentation was alternated to limit order of passage presentation as an effect. The administration procedure for the six classes was ABC, ACB, BAC, BCB, CAB, and CBA, with A being fiction, B, science, and C, social studies. The *Statistical Package for the Social Sciences* (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975) was used for computer analysis of the data. A correlated *t* test was used to test for significance of differences between the means of the three passages.

All findings were tested for significance at the .05 level. A descriptive analysis was made of students' performance on the passages by levels established in the *Inventory.*

Results

All three passages were completed by 154 students. The means and standard deviations on cloze scores for the three content areas were as follows: social studies (X=15.27, SD=5.61); science (X=13.04, SD=4.98); fiction (X=12.60, SD=4.32). Results showed there was a significant difference between social studies and science and social studies and fiction at the .001 level. No significant difference was found between science

and fiction. According to mean scores, social studies was easiest for this group.

According to percentage correct for the mean scores, the group was performing at the following levels: social studies, 51 percent, Instruction (Definite); science, 43 percent, Instruction (Caution); Fiction, 42 percent, Instruction (Caution).

Combining the two categories for instruction level, 115 students performed at independent or instruction levels in fiction. In both science and social studies, 99 students scored at these levels. Thus, according to levels for instruction, students performed best on fiction with no difference between science and social studies.

Occasional comments made by students completing the cloze passages highlighted the importance of selecting titles for cloze passages that did not create initial confusion. Students, although they had been told that no words could be pronounced for them, frequently asked that the title of the social studies passage "Mutiny" be pronounced. The title of the fiction passage "Disc" was misread as "Disco" by several students. Some students also expressed frustration with a task that was obviously new to them.

DISCUSSION

This study provides further evidence of differential abilities in content area performance. As in previous studies, results continue to be conflicting regarding the relative difficulty of the content areas for different groups of students. The need for further testing of comprehension through cloze tests in the content areas is suggested by this study. With the *Inventory* providing reading and cloze passages in the content areas, further studies could be conducted utilizing the same reading materials. However, as noted, adjustments may need to be made to assure ready comprehension of passage titles by students completing cloze passages. Additionally, more experience with the cloze procedure before its use as a testing procedure will insure that content area difficulty, rather than the nature of the task, is being assessed. The conflicting results regarding difficulty level from comparing students' scores statistically and descriptively highlights the need to describe data in both ways.

REFERENCES

Boyce, M. W. A comprehensive bibliography of the cloze procedure. October, 1974, 31 p. (ERIC Document Reproduction Service No. ED 09a 830)

Boyce, M. W. A comprehensive bibliography of the cloze procedure. Part B. September, 1976, 16 p. (ERIC Document Reproduction Service No. ED 127 580)

Cohen, J. H. The effect of content area material on cloze test performance. *Journal of Reading*, 1975, *19*, 247-250.

Davidson, E. S. An analysis of fourth and sixth grade reader performance using cloze tests, group reading inventory, and a standardized reading test. November, 1980, 41 p. (ERIC Document Reproduction Service No. ED 195 984)

Dodd, E. The effects of different content area materials upon the comprehension of eighth-grade students. October, 1973, 51 p. (ERIC Document Reproduction Service No. 085 670)

Harris, A. J. & Sipay, E. R. *How to Increase Reading Ability* (6th ed.). New York: David McKay, 1975.

Hicks, R. D. & Monroe, E. A comparison of reading achievement, current reading placement, sex, age, intelligence, informal reading inventory, and the cloze procedure. November, 1979, 13 p. (ERIC Document Reproduction Service No. ED 181 438)

Jongsman, E. R. The cloze procedure: A survey of the research. August, 1971, 46 p. (ERIC Document Reproduction Service No. ED 050 893)

Nie, N. H., Hull, C. H., Jenkins, J. G., Steinbrenner, K., & Bent, D. H. *Statistical Package for the Social Sciences* (2nd ed.). New York: McGraw Hill, 1975.

Rinsky, L. A. & de Fossard, E. *The Contemporary Classroom Reading Inventory*. Dubuque, Iowa: Gorsuch Scarishrick, 1980.

Taylor, W. L. Cloze procedure: A new tool for measuring readability. *Journalism Quarterly*, 1953, *30*, 413-433.

DEVELOPING COGNITIVE RELATIONSHIPS IN SOCIAL STUDIES THROUGH TRADE BOOKS

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Our goal in education should be to develop self-sufficient, rational, independent human beings who are capable of functioning satisfactorily in our society. Plugging all students into the same machine, assigning all students the same workbook pages, and/or developing the same skills in all students will not accomplish this. Criterion referencing every conceivable behaviorial objective will not insure independent learners. All this usually accomplishes is encouraging the teacher to assign the same materials at different times to different students. Trade books offer the easiest, most adaptable, and a pleasurable means for individualizing the curriculum.

First, let us consider the function of textbooks in the classroom. They serve as a core upon which to focus the teaching of skills and a common base from which to extend knowledge into individual pursuits. Textbooks are designed to impart information. Because of this, they rarely entice students to read them avidly.

Most textbooks condense any subject to minimum essentials, as determined by the bias of the authors. They are generally non-controversial, because they are to be sold to all types of school systems. And, they are written with little style and fail to catch the interest of the reader.

I believe there is also a psychological factor operating. Textbooks are work—and therefore, it is difficult to interest students in reading beyond the assigned number of pages.

This is why we must use caution and good sense when we incorporate the use of trade books in the curriculum. They must *not* become a substitute for the textbook, but become an exciting, appealing means for a student to pursue his/her own contiguous or tangential interests in relation to the core topic. No matter how superb a trade book is, not all students should be made to read it. A variety of books should be available and individual choices should be made.

Let me give you several examples of how trade books can be used effectively. In a popular social studies text, 19 pages, in a book of 848 pages, are devoted to America in World War II. What possible depth of knowledge or of understanding can be developed in reading 19 pages and answering two pages of questions on the topic? But, from some arid, single paragraphs in a textbook can come an intense involvement with a subject, as expanded in reading of trade books.

People, emotion and committment are missing from textbooks. Here is a paragraph from the social studies text. "The Italian dictator, Benito Mussolini, had a bold plan. He talked of restoring the power of the ancient Roman Empire in modern Italy. To support his plan, Mussolini built up the Italian army and air force. He was proud of his fighting forces and was eager to see them in action." Compare this with Eric Haugaard's *The Little Fishes,* in which Guido, a 12 year old orphan, experiences the war in Italy. Begging, stealing, lying, protecting his friends, watching them die—this was Guido's war—a far cry from Mussolini's dream.

Another paragraph in the textbook tells us—"In 1933 Adolf Hitler became dictator of Germany. And as soon as he became dictator, Hitler set up a police state. A police state is a nation in which the commands of the dictator are law. Special police

stand ready to enforce the dictator's laws and commands, and the people are forced to obey." But, James Forman writes of four German young people who did not obey. In *Ceremony of Innocence,* Hans and Sophie Scholl and two friends defied the Gestapo and wrote and distributed leaflets decrying the "Nazi cancer." Hans continuously fought his fear to do what he felt was right (page 16 & 17). Hans and Sophie died for their beliefs (p. 244) but they are remembered and their moral integrity lives on (p. 248-249).

The horror of German concentration camps is dispatched in one paragraph in the textbook. "In Hitler's concentration camps, suffering and terror were daily events. Vast numbers of German Jews were killed. Some died from slow starvation or torture. Many thousands were killed in gas chambers. By the end of World War II, the Nazis had murdered six million European men, women and children of the Jewish faith." How much more eloquent is the book of poems written by Jewish children under the age of 15 who passed through Terezin concentration camp. Of these, around 100 came back. The poems reflect the horror and the hope that these children held. A 13 year old describes Terezin in the book *I Never Saw Another Butterfly.* A portion of his poem (p. 22) reveals:

TEREZIN

That bit of filth in dirty walls,
And all around barbed wire,
And 30,000 souls who sleep
Who once will wake
And once will see
Their own blood spilled.

I was once a little child,
Three years ago.
That child who longed for other worlds.
But now I am no more a child
For I have learned to hate.
I am a grown-up person now,
I have known fear.

Another paragraph states "As Hitler's armies conquered country after country millions of people were taken away from their homes to work in slave labor camps. They worked in factories and on farms to help provide the food, weapons and supplies for Hitler's armies." Esther Hautzig's auto-biography, *The Endless Steppe,* tells of one such family in Poland. Torn from their home, they are sent to Siberia to work in a gypsum mine. The will to survive, the sense of family and the incredible sustaining of humor come through as the catalyst that helped them survive. This story of a real family will enhance a sense of empathy with those caught in the turmoil of war.

And, a final example, one paragraph is devoted to the bombing of Japan. "On August 6, 1945, an American bombing plane dropped a single atomic bomb on the Japanese city of Hiroshima. The bomb destroyed nearly all of the city. Three days later, tbe United States dropped an atomic bomb on the Japanese city of Nagasaki." Compare this with Lifton's *Return to Hiroshima,* (pages 31 + 32). On these two pages she tells of one child, Sadako Sasaki, who was a victim of that bombing. In a low key but powerful statement she tells of her secumbing to leukemia and the effect on her family and friends. The entire book is devoted to a look at the aftermath of atomic war. Not as a condemnation of that specific act, but as a warning for the future.

This same technique of extending the textbook can be accomplished in any subject matter area. Ecology is a prime subject for discussion in social studies, as it has an effect on everyone and there are so many viewpoints. The value of using trade books is that a variety of viewpoints can be presented effectively, while a textbook usually presents one viewpoint.

We rarely destroy what we appreciate, and one phase of ecology is developing an appreciation for our environment. Many books accomplish this, but two come readily to mind. Rebecca Caudill's *Wind, Sand and Sky* is a marvelous evocation of the beauty to be found in the so-called barren wastelands. She makes us see with new eyes. Byrd Baylor has written numerous lovely books relfecting the beauty of nature, and her *The Other Way to Listen* is a lyrical prose/poem that might aide students in listening to as well as seeing nature.

Two author/illustrators question whether change is always positive. Jörg Müller has created two folios of fold-out pictures, *The Changing City* and *The Changing Countryside.* Each folio traces one scene, a city block and a pastoral scene, over 20 years in 3 year intervals. The possibilities for discussion are endless. John Goodall takes one corner in *The Story of an English Village* and shows its transformation from the 14th century through today. The effect is stunning and not a word is written.

Several recent books look at individual topics of concern. *Checks and Balances* explores the many sides of the Alaska pipeline case. *Rescue from Extinction* examines the biology of extinction, citing case histories, and then tells of the way scientists and laymen are rescuing some species from that fate. *The Oceans, Our Last Resort* examines the abuses made on the oceans and offers suggestions for careful management and cultivation of this valuale resource. Numerous books on specific topics are available in today's libraries.

Rachael Carson sums up my philosophy of teaching in her magnificent book *The Sense of Wonder.* When discussing her nephew's knowledge of nature, she states, "I am sure no amount of drill would have implanted the names so firmly as just going through the woods in the spirit of two friends on an expedition of exciting discovery." (p. 18).

Learning is exciting, and we should share it with our students.

REFERENCES

Baylor, Byrd and Peter Parnall. *The Other Way to Listen.* Scribners, 1978.

Brown, Joseph. *Rescue from Extinction.* Dodd, Mead, 1981.

Carson, Rachael. *The Sense of Wonder.* Harper & Row, 1965.

Caudill, Rebecca. *Wind, Sand & Sky.* Dutton, 1976.

Forman, James. *Ceremony of Innocence.* Hawthorn, 1970; Dell, 1977.

Goodall, John *The Story of an English Village.* Atheneum, 1978.

Haugaard, Erik. *The Little Fishes.* Houghton Mifflin, 1967.

Hautzig, Esther. *The Endless Steppe.* Crowell, 1968.

Lieberman, Jethro. *Checks & Balances.* Lothrop, 1981.

Lifton, Betty Jean. *Return to Hiroshima.* Atheneum, 1970.

Marx, Wesley. *The Oceans, Our Last Resource.* Sierra Club, 1981.

Müller, Jörg. *The Changing City* and *The Changing Countryside.* Atheneum, 1977.

Volavkova, Hana, ed. *I Never Saw Another Butterfly.* McGraw-Hill, 1965; Shocken Books, 1978.

READING IN THE DISCIPLINES: POST SCHOOLING CONCERNS

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One goal of education is preparation for life. Reading educators concerned with reading in the disciplines are therefore appropriately concerned with their student's future reading/learning behaviors. If reading instruction in the disciplines has had an impact upon behavior this should be partially reflected in the adults' use of related books and mass media. It has been argued (Strang, 1956) that educators are not, in fact, helping their students meet stated educational goals. That argument will be restated here in a different form in order to suggest what educators in the disciplines must do to promote stated goals.

This argument will be pursued by 1) assessing current adult reading/media behavior in terms of the goals of education; 2) relating adults reading/media behavior to their larger educational/socializing context; and 3) emphasizing steps reading educators must take if stated educational goals are to be met within the present and lifelong curriculum.

Information is conveyed to adults through books, newspapers, magazines, radio and television. Since one media stimulates activity and influences activity in the other media-reading in the disciplines will be considered broadly here. That is, given that the goal of teaching reading in the disciplines is to encourage exposure to learning in the disciplines—all media will be considered. Therefore, the term reading/media will here be used to refer to books, magazines, newspapers, radio and television.

Reading Behavior of Adults

If the reading/media behavior of adults reflects the goals of education—what would those goals appear to be? Consider the status of adult reading/media habits. The research methodology in this area has provided largely survey or descriptive data. This data has been criticized for a variety of reasons, but largely because checklists or reading inventories used in this line of research do not have documented reliability or validity (Purves and Beach, 1972). However, certain patterns of behavior are consistently reported. It appears that most adult reading is functional reading (Sharon, 1973-4); most adults read or at least scan a newspaper daily and over a third of adults spend some time with books or magazines (Asheim, 1956).

Actually, reading of books tends to be a rather exclusive activity—20% of all readers account for 70% of all books read (Purves and Beach, 1972). Waples in 1912, pointed out that "heavy readers are those with little else to do" (p. 184), unfortunately, this worrisome fact still appears to be valid. Reading/learning in the disciplines, beyond the individual's job is limited. The average adult gets most of his/her news and information from television (Robinson and Jeffers, 1981) and believes the news from this source more than other sources (Larkin, et al, 1977). However, television is used largely to pass the time, for companionship, entertainment and to a lesser extent for information (Rubin, 1981). Also, adults who get most of their information from televison tend to be more passive or non-involved politically. Newspapers are also used more for entertainment, sensational news, and pictorial material than for information. Adults prefer to read about themselves and their family versus their community and world. (Asheim, 1972; Larkin, et al, 1977).

There does seem to be a growing interest in reading in some disciplines. There is, for example, more interest in science news (Nunn, 1979) and in nonfiction books (Purves and Beach, 1972). This is consistent with the above behaviors since interest in science/nonfiction articles tend to be in areas as better health, diet or areas related to self, as a survey of the nonfiction 'best seller' list indicates.

The factor controlling adults use of media/books tends to be related to visibility and accessibility. The more space given to an item in the news, the more likely people are to read this; the more available materials, the more they are read.

If these behaviors reflected planned educational goals then the goals of education would be described as: 1) learning to use books and mass media for entertainment, 2) acceptance of television as the most valid source of information, 3) use of available sources of information, 4) learning to focus upon self not the world, and 5) developing habits of passive political behavior. Reading in specific areas of any discipline would appear to be for the specialist.

Stated goals of the educational process are obviously different. Education of self was not intended to foster a preoccupation with self or entertainment of self. The importance or preparing students to read i.e. to learn in the disciplines is underscored when these true goals of education are considered. Goals of education generally include: learning to be a problem-solving person and accepting one's responsibility for oneself and one's role in society, learning "to weigh the worth of what we have done or dare to do . . . (Jennings, 1965) and developing habits of "activity of thought" and "the art of utilizing knowledge." (Whitehead, 1929).

To some extent there has been success in reaching these goals, and education—at least higher education—is associated with that success. For example, more educated adults read more and use media differently (i.e. not only for entertainment). Yet, for the greater numbers of our students post-schooling reading/learning in the disciplines, except in job related areas, appears to be minimal.

Reading in the Disciplines: Lifelong Curriculum

There are, of course, many reasons why education has not made a greater impact of post-schooling reading/media behavior. Two reasons will be considered here 1) the pervasiveness of the non-school curriculum and 2) habits developed by the school curriculum.

There is a curriculum we all face throughout our life—this curriculum runs concurrently with formal schooling and becomes the sole and pervasive curriculum for most adults for more than two-thirds of their lives. This curriculum has well-articulated goals. If we consider these goals as stated and evaluate these also in terms of the goals these reflect for adults, an interesting picture emerges. The life-long curriculum for reading in the disciplines is, of course, that generated by mass media i.e. television, radio and newspapers. The goals of the mass media are 1) to act as "leaders of the masses," by following Walter Lippmans' dictate for developing a "picture of reality on which men can act;" 2) to be the social conscious of the community (Lehnert, 1980); 3) to act as a socializing agency (Courtright and Baran, 1980), to be opinion molders and "to inform, interpret, guide and entertain" (Bond, 1961). If these are the goals of the media then it follows that the media's goal for adults might be interpreted as developing adults who will 1) follow, 2) respond to messages involving social criticism, 3) become homogenized, i.e. be responsive to reports on changing social/cultural moves, 4) seek guidance and their opinion from the press, and especially 5) seek to be entertained.

There are similarities between the goals of education and the media: both purportedly strive for well-informed and civically active adults. Educators, however, seek to develop people who will structure and evaluate information and make well-informed decisions. The media apparently strives to structure information and personalize news to promote specific action.

These differences in goals need to be evaluated to determine if educators are inevitably promoting the goals of the mass media—that is developing uncritical consumers of mass media. If the two curriculum developers are evaluated in light of current adult reading/media habits—the media is meeting its

curriculum goals-educators are not.

Preparation for the Lifelong Curriculum

If reading/media behavior related to learning the disciplines is to reflect the goals of education then educators must deal with the context in which this learning will take place. That is, educators then must prepare students for dealing with mass media or specifically with reading/learning in the discipline from mass media sources.

It may be unfair to criticize the mass market for failing to promote either some of their own highly state goals or the goals of education. It might be argued that if given interests and habits had been developed in the schooling process, the mass media would be able to profitably promote goals stated by educators.

Media experts and educators agree that the continued growth of information, the impact of new technology on an individual's lifestyle, and the importance given public opinion—all require a well-informed, involved, information seeking, decision making public. Most of the information coming to the public in the post-schooling context will come from mass media, and media experts recognize limitations in their presentation of this information. Since these limitations result in the influencing of public opinion or in the potential biased presentation of information—they are essentially propaganda techniques. Those propaganda techniques which serve to subvert however unintentionally, the goals of education need to be recognized by educators. If educators can, in turn, enable their students to deal with these propaganda techniques, they might be more successful in promoting more effective post-schooling reading/learning inthe disciplines.

Students are currently instructed to identify 'propaganda techniques' such as use of the plain folks approach and card stacking (Singer and Donlan, 1980). However, these might be termed "micropropaganda techniques" because they exist "within" a given article or source. To become a critical, active, or self-initiating decision maker students must recognize "macro-propaganda techniques" or strategies which influence the larger news or media picture.

The goal here in emphasizing macropropaganda techniques is not to develop more animosity toward books/media or to create more cynical consumers, for this might only result in more passive withdrawal from information sources. The goal in promoting recognition of these techniques should be to help students recognize and deal with practical constraints upon themselves and the media. This caution is important for recognition of micropropaganda techniques has apparently been effective. That is, readers are sensitive to these micropropaganda techniques such as "twists of expressions" (Berry, 1976, p. 119) and one wonders if recognition of these techniques has lead to the decline in newspaper readership or to the fact that less than 30% of the population state that they accept at face value, statements made in the news (O'Keefe, 1981).

It should be pointed out that media constraints and resultant macropropaganda techniques are closely intertwined with what the media perceives as time and information processing constraints of individuals. The six macropropagenda techniques presented here are all criticisms raised by media people: They have criticized presentation of information in terms of the: 1) focus upon entertaining or "gratifying" readers/viewers; 2) simplification of information; 3) personalization of information; 4) influence or habits of mind; 5) the striving for visually capturing events; and 6) the fact that media is controlled by a few, often vested, interests. The six macropropagenda techniques parelling these criticisms are labelled and discussed below.

1. *Let me entertain you*

Students must recognize that their own desire to be entertained influences what type of and how much news they are presented. Entertainment is fast becoming a major media goal. Students can evaluate this entertainment focus by asking, "what are these people saying about me to present me with this?" If they were eighteen and given a dool or toy for their birthday they would be insulted by the 'giver'—students must also realize when their intelligence cn be insulted by the news reporting. It might help if students evaluated their own use of media in relation to (desired) self-concept as a person and their (desired concept of adult peers.

2. *Let me make it easy for you*

Media and book coverage of any topic of information cannot be criticized for clarifying information—but when clarification results in extreme exclusion or distortion of information, students must be concerned. Reese and Miller (1981) suggest that the wealth of available information is so confusing that structuring this information becomes necessary to "mold well-structured . . . . well-stocked attitudes."

It is often suggested that today information is so complex that much cannot be comprehended by the general educated public. It is true that today even experts do not even fully understand each other. But this does not mean we must be directed by a very small carde of individuals but that different information must be sought (consequences, related values). Students need to be accustomed to seeking and weighing multiple sources of information and recognize the fact that sometimes even the experts do not know all the facts. The experts and their interpreters must be respected for admitting when information is not fully known or available and allow adults to understand when a 'leap of faith' is being requested. Students must also learn to a) require that multiple viewpoints be presented by experts and b) that these views and related information be evaluated by experts.

The classroom use of a single textbook, single source of information may in fact discourage a life long habit of seeking varying viewpoints and the constant search for the right answer may inhibit the ability to deal with uncertainty.

3. *You, you, you*

Information is personalized in the media to promote interest. Media sources seek to meet identified interests and to selectively relay information relating to these interests. Womack (1981) has shown that the selective attention of various newspapers to news in the world results in readers acquiring quite different views of the world. It might also be pointed out that interest can be created if an event can be personalized (as hostages in Iran). There is a Catch 22 quality to this phenomena for the media can only capture readership/views in terms of their present interests; it is unlikely that news relating to broader interests will be presented, and thus unlikely that broader interests will be developed. Educators need to develop in students the habit of requiring information on what the event means to the larger unit involved as well as to individuals. If an individual's world view is to grow and not to be totally controlled by media, students need to automatically ask for related economic, social, and political information.

4. *"Brevity is the 'hole' of the mind"*

Space/time of limitations of media result in highlighting and abbreviating reporting of news events. Novak (1975) points out that the nature of media is likely to impact on habits of the mind. The rapid science switching of television, he points out, does not promote evaluation or structuring of information. The newspaper has in effect "imitated" the cryptic television reporting sytle by highlighting news-briefs. Perhaps these news blurbs are satisfying to stuents who are accustomed to passively dealing with or "learning" cryptic, isolated bits of information. If students' "habits of mind" required in-depth information, these cryptic presentations would be less satisfying. Students should at least learn to demand a news overview and a rationale for the focus of a news story and to question the cryptic, event-focused nature of news reporting.

5. *"Seeing is believing"*

What is seen on television is believed more. This may not be because television news is actually more accurate. As noted earlier, students have been taught to criticize the misuse of the "word"—they are less critical of the misuse of the picture. Students need to recognize how viewpoints or facts can be manipulated by controlling the angle or frame of a picture.

6. *"It is a business world"*

The world of science, news, discovery becomes limited when vested interests are involved in a news event. Carter and Adler (1975) point out that 90% of the most widely used source of information (television) is controlled by three networks. The number of newspapers in the country and publishing houses are also decreasing and increasingly coming into the hands of fewer and fewer sources. Book publishers, media sources could not continue if they did not make a profit. Students must consider to what extent this can result in a public disservice. For example, Berry (1976) pointed out that even when a television show had a large audience, it was dropped because the viewers were non-buyers i.e. middle-aged or over (p. 17). Media sources may "slant" information in recognition of a debt to a sources of support. There are institutes and grant funding institutions dedicated to bringing to the public to their own views by news releases. This can expand the range of information presented when the source and orientation are identified. Students simply have to inquire about the political and financial interests/goals of those who control their information source. Moreover, students can learn to identify slanting of the news better, if the controlling interests are clear.

Summary

The schools are not meeting their goals in developing concerned active citizens who seek to continue to read/learn within the disciplines. The fault for this may be shared by the schools curriculum and the wider life-long curriculum provided by the mass media. Critical evaluation of the mass media might result in positive use of and changes in both the school and lifelong curriculum.

REFERENCES

Asheim, L. "What do adults read," in N. Henry (ed.) *Adult Reading.* 55th Yearbook of the National Society for the study of Education. Calif.: University of California Press, 1956.

Berry, T. *Journalism in America.* New York: Hastings House Publ., 1976.

Bond, F. *An introduction to journalism.* New York: Macmillian Co., 1961.

Carter, D. and Adler, R. *"Television as a social force: New approaches to televison criticism,"* New York: Praeger Publ., 1975.

Courtright, J. and Baran, S. "The acquisition of sexual information by young people" *Journalism Quarterly.* Spring, 1980, *57,* (1), 17-114.

Jennings, F. *This is reading.* New York: Teachers College Press, 1965.

Larkin, E., et al. "The 21-34 year old market and the daily newspaper." *ANPA News Research Report. 1,* April 8, 1979.

Lehnert, E. "A market segmentation study of youth markets, perception of the ideal newspaper," Boston, Mass.: Association for Education in Journalism August, 1980. (ERIC Document Reproductive Service No. ED 191 072).

Novak, M. "Television shapes the soul," in D. Carter and R. Allen (eds.) *Television as a social force: New approaches to television criticism.* New York: Praeger Publ., 1975. 9-21.

Nunn, C. "Readership and coverage of science and technology in newspaper." *Journalism Quarterly.* Spring, 1979, *56,* (1), 27-30.

O'Keefe, G. "Political malaise and reliance on media." *Journalism Quarterly.* Spring, 1980, *57.* (2), 122.

Purves, A. and Beach, R. *Literature and the reader.* Illinois: National Council of Teachers of English, 1972.

Ray, G. "Books as a way of life in Mohrardt (ed.) *Reading in a changing world.* Muchen: Verlag Dokumentation, Publ., 1976.

Reese, S. and Miller, M. "Political attitudes: Molding and structure." *Communication Research.* April, 1981, *8,* (2), 167-188.

Robinson, J. and Jeffers, L. "The great age readership mystery." *Journalism Quarterly.* Summer, 1981, *58,* (2), 219.

Rubin, A. "An examination of television viewing motivation." *Communication Research.* April, 1981, *8,* (2), 141-165.

Schramm, W. "Why adults read," in (ed.) N. Henry, 55th Yearbook of the National Society for the study of Education. Calif.: University of California Press, 1956.

Sharon, A. "What do adults read?" *Reading Research Quarterly. 9,* (2), 1973-4, 148-169.

Singer, H. and Donlan, D. *Reading or learning from text.* Boston, Massachusett: Little Brown and Co., 1980.

Stevenson, R. and Greene, M. "A reconsideration of bias in the news." *Journalism Quarterly.* Spring, 1980, *57,* (1), 115-121.

Strang, R. "Adult readers and the aims of American education," in N. Henry (ed.) *Adult reading.* 55th Yearbook of the National Society for the Study of Education. Calif.: University of California Press, 1956.

Tillinghast, W. "Declining newspaper readership: Impact of region and urbanization." *Journalism Quarterly.* Spring, 1981, *58,* (1), 14-23.

Waller, T. "Libraries and reading at the point of changes," in F. Mohrhardt (ed.) *Reading in a changing world.* Muchen: Verlag Dokumentation Publ., 1976, 31-9.

Waples, D. *Research memorandum on social aspects of reading in the depression.* New York: ARNO Press, 1972.

Weaver, D. and McCombs, M. "Journalism and social science," a new relationship. *Public Opinion Quarterly.* Winter, 1980, *44,* (4), 477-494.

Whitehead, A. *The aims of education.* New York: Fress Press, 1929.

Womack, B. "Attention maps of 10 major newspapers." *Journalism Quarterly.* Summer, 1981, *58,* (2), 256-265.

READING HABITS, PATTERNS, AND INTERESTS OF OLDER ACTIVE READERS

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The study of older readers is important for several reasons. As the population of the United States continues to increase at upper age ranges more must be understood about aging readers so that adequate services might be provided. From another perspective, historically documented reading phenomena may yield valuable clues for early encouragement of lifetime reading habits for youth.

Current research on the reading of the elderly yields little conclusive evidence concerning life-long reading (MacLean & MacLean, 1979). General surveys and literature reviews (Moshey, 1972; Sharon, 1974; Harvey, 1979) report a lessening of reading time at upper age levels, and a preference by good readers for newspapers and magazines, poetry, history, historical novels, biographies, and travel books. Watson and her associates (1979) and Harvey and Dutton (1979) observe that novels with sex and violence and science fiction are not preferred reading by retired citizens. Less well-educated individuals are judged to be reluctant readers.

Purpose of the Study

With few exceptions, the research on older readers has been conducted using populations which include habitual readers as well as those who do not or cannot read. It is the intent of this study to focus exclusively on the habits and behaviors of individuals in their retirement years who are active lifetime readers. Although the observations from this study cannot be generalized to a broad population, they present a more clearly delineated profile of the active reader in retirement.

Related Research

Noteworthy investigations of older readers present some insights into reading as a process for older readers. By analyzing

the reading miscues of older readers, Watson et al. (1979) and De Santi (1976) imply that active readers process in large linguistic units and that the push for meaning is a processing strength. Although oral reading is unnatural to most good adult readers, the miscue analysis approach offers opportunity for direct behavioral observation.

To discover whether or not the purposes for reading have a life span perspective, Wolf surveyed 249 retired persons in Kent County, Michigan. Using an 18-item questionnaire and taped group interviews, he discovered that older readers read to fulfill needs beyond functional literacy and that reading provides coping mechanisms pertinent to the problems of aging. Ngandu and O'Rourke (1979) asked 267 older citizens to complete a questionnaire concerning reading and other behaviors. Their results suggested that reading was done for enjoyment and information. Time spent in reading was equivalent to time watching television.

Similar conclusions were drawn by Ribovich and Erikson (1980) following home interviews with 30 randomly-selected subjects who were members of the American Association of Retired Persons. Of the group interviewed, most read for enjoyment and to "keep current." Television was cited as a major source of news with newspapers a distant second source. Problems which were identified as interfering with reading include visual constraints (20%) and fatigue. Early family influences suggested that good readers were generated from school-oriented families with a mother or grandmother who read to the children. For Ribovich's and Erikson's subjects, the amount of reading increased from middle to older ages.

These investigations provide important insights into the behaviors of older readers. The study presented in this paper attempts to describe more completely behaviors of good older readers. It further attempts to utilize the reading autobiography recommended by Ngandu and O'Rourke (1976) as a method of investigation which "... might help isolate particular variables which seem consistent among these older citizens."

Subjects

The subjects for the present phase of this investigation were 21 retired citizens currently living in Virginia and Pennsylvania who ranged in age from 70 to 95. They presently live in private homes or apartments, a residential hotel, a private retirement complex, and a church-affiliated retirement complex. The sample included 17 women and 4 men; a more skewed distribution than the 70:30 ratio reported by the Harris Survey (1975) conducted for the National Council on the Aging. Twenty of the subjects were white; one was black. They were individuals who identified themselves as active readers and who agreed, upon request, to participate in an in-depth taped interview conducted by the investigators.

Demographic Characteristics of Active Retired Readers

Demographic data gleaned from the interviews revealed the following information about the subjects:

1. They were born in the southeastern, northeastern, or midwestern regions of the United States. One individual was Canadian.

2. They were from families ranging from only-child status to seven siblings. None of the subjects who were parents had more than three children—the majority (42%) had two children.

3. They include six single, three married, one divorced, and nine widowed individuals.

4. An analysis of the highest education level attained by the subjects would refute the observations in previous studies that education is a factor in good reading. The present sample included the following distribution:

Highest Education Level:

grammar school (8th-10th)	—4
high school	—6
Bachelor's degree	—6
Master's degree	—6

Ten of the subjects indicated evidence of continuing education, both formal and informal, beyond the highest level of education attained.

5. Career experiences for these individuals covered a wide range of occupations over a life span. More frequently occuring occupations included teaching, homemaking, military service as a civilian or officer, library work and clerical work. Unique careers mentioned were children's theater director, fashion model, and newspaper feature writer. Professional affiliation with organization appeared to have been generally discontinued, although four women were still active in the American Association of University Women.

6. Current memberships in social and religious groups ranged widely, and, in some instances, paralleled hobbies and interests other than reading. Frequently mentioned social memberships included church groups (10), women's clubs (6), historical societies (3), and fine arts societies and organizations (10). Only three individuals reported membership in organizations designed for retired persons.

7. Avocations in addition to reading included 24 types of activities. Interest in the theater, music, handwork, and travel were most frequently reported.

8. Of the 21 subjects, 13 stated that they were in good health. A number (17) of typical health problems were identified with visual problems, arthritis and hypertension reported most frequently. The intraction of physical factors and reading is addressed in subsequent discussions.

Method

Each subject was interviewed for 60 to 90 minutes at his/her residence at a time convenient to the interviewee. Subjects were given an explanation of the project and were informed that the taped interviews would remain anonymous. An interview guide prepared by the investigators included questions designed to elicit elaborated responses concerning reading habits, reading interests, and the impact of environmental and physical factors on reading. The guide was preceded by a case history survey also conducted orally. Interviews were taped for greater accuracy of data gathering. The taping also provided an analysis of the nuances and affect coloring an individual's response, increasing the opportunities to analyze the behavioral patterns described.

Information obtained from the interviews was categorized by recording behaviors from written notations and taped interviews.

Observations

Developmental History of Reading Behavior

Typically, the active older reader in this study recalled an early interest in literature. Three of the subjects reported having learned to read before entering school. Few individuals could remember the exact method for learning to read, but most experienced early the joy in reading that one octogenarian's remarks illustrate: "I remember that I was so happy when I got to school and learned to read and write all by myself." Specific early reading impressions recalled included learning by the "whole word" method, rapid reading of adventure stories, and time spent in the free reading corners of the classroom.

As might be expcted, the mother was influential in early reading development as a model and as the person who most frequently read to the child. Individuals who were reported as singularly influential in guiding early reading were mother (57%) and father (33%). Others mentioned were private tutor, teacher, neighbor, aunt, and sister. Motivating environmental factors during the early years of reading included the presence of home libraries (29%), family read-together times (29%),

early exposure to the public library (23%), and books received as gifts.

Favorite childhood books remembered represented a wide range of types with fairy tales, adventure and series books being among the most popular. Classics, such as *Treasure Island, Alice in Wonderland, Lamb's Tales of Shakespeare, Robinson Crusoe,* and *Little Women* were noted. One woman indicated that her family could only afford to buy the very best literature; therefore, she had read few children's books. She had, however, read Dicken's *Tale of Two Cities* and Hugo's *Les Miserables* by the time she was twelve.

During the adolescent years, the subjects described patterns which incorporated the reading of the "forbidden" books from which they learned about human sexuality. Such stories as *The Sheik* and *The Flaming Youth* were read with guilty excitement. Growing adult interests were illustrated by the reading of the works of Edith Wharton, F. Scott Fitzgerald, Dickens, Poe, Hugo, and D. H. Lawrence. History and historical fiction endured as popular types of reading.

Patterns of reading in the middle years were characterized by the same types as are found in current reading by 38% of the subjects. Readers enjoyed more contemporary fiction, more interest in travel, more romantic novels and more career-related materials.

Mothers reported the beginning of late-night reading habits (after the children were in bed) which appeared to persist into retirement years. Regular use of the library had been established and continued to be an important part of the adult reading routine.

Several fascinating patterns were described which depicted the avid reader. One clerical worker mentioned reading on the bus to and from work. A teacher/mother indicated that she usually had two books going at the same time—one professional and one for pleasure reading. Three women mentioned going on "reading orgies," forsaking food and sleep and putting housework aside to read intensely for long periods of time. The social status of reading was illustrated by the comment of one woman who said, "I went through a real snotty period, thinking I couldn't read anything that wouldn't benefit me intellectually." A scientist recalled that his pace slowed during the college and career years when he was reading detailed information and wished to avoid re-reading. He traced this behavior to his current inability to change reading pace to adjust to different types of materials.

The behaviors recalled seemed to reflect readers who sustained continued interests which began early and expanded throughout adulthood. The influence of one's career or work experiences was judged to be significant by 62% of the subjects. As one woman said, "Everything led to the library." Conversely, it might be suggested that interest in reading may have predisposed some individuals to select their particular careers or to choose certain avocations.

Observations of Current Reading

Routine:

Daily reading was reported by all but the one subject who is now blind. He has readers for four hours weekly and reads five to six of the "Talking Books" (Virginia Commission for the Blind) every two weeks. Of the 21 subjects, eight said that they read anytime they can; however, particular patterns were observed. Early morning newspaper reading is favored by 10 (48%) of the group. Bedtime is the second favorite time for reading, enjoyed by nine (43%) of the group. Late-night reading seemed popular for five women (24%). Habits carried over from child rearing years and coping with the pain of arthritis seem to contribute to the establishment of the late-night routine.

Kinds of Reading Materials:

Consistent with survey findings reported by Moshey (1972), Sharon (1973-74), and Ngandu and O'Rourke (1979), the newspaper was one of the most popular reading materials. Twenty subjects read the newspaper daily with 14 (67%) preferring the morning paper. Other newspapers read routinely by eight individuals included the *Wall Street Journal, New York Times,* the *Washington Post,* and the *Richmond Afro-American.* Magazines were regularly read by 16 (76%) of the subjects; however, only nine (42%) reported subscribing to magazines.

A consistent pattern of preference for fiction or non-fiction was not in evidence for the group interviewed. Seven (33%) of the subjects stated a preference for fiction, while eight (38%) preferred non-fiction.

The preferred categories selected by the subjects in this study correspond closely to those reported by Moshey (1979) and Ribovich and Erikson (1980, who found that lifetime readers tend to enjoy biography, history, historical fiction, and mystery.

A phenomenon reported in this study which has not been discussed in other studies is that of re-reading. Nine of the 21 subjects reported that they frequently re-read material that they have previously read, sometimes as often as five or six times. Re-read materials were usually books which have been childhood favorites, Shakespear's plays or works of preferred authors. The re-reading phenomenon did not appear to be a function of lack of material; rather it seemed to be a desire to recapture a mood established as the reader interacts with the text.

Interest and taste in magazines or journals range widely for this group of readers. Currently the 21 subjects reported reading 35 different magazines and one professional journal. Avocational interests appeared to control selection in magazine reading. The most popular magazine choices were categorized as women's/ homemaking (61%), news/political (48%), and *Reader's Digest* (38%).

Access to Books and Other Reading Materials:

As a whole, the subjects expressed minimal concern with access to materials. They knew how and where to get the types of materials they wanted to read. It was also noted that they kept in their living quarters selections of newspapers and current magazines, a book or two currently being read, and small collections of well-bound keepsakes. Few of the subjects had room for extensive libraries in their present living arrangements; consequently, books were in continuous flow from library to reader or from reader to a friend or relative. Because of this continuous flow, a trend in access did not emerge. Bookmobile users were exchanging selections on a two-week basis.

The most common sources for reading materials for the subjects were the public library (71%), direct purchase of hardback and paperback books (71%), friends and relatives (43%), and residential libraries (33%). Other sources mentioned less frequently were gifts, social club libraries, church libraries, and state library. Book club subscriptions represented a rather insignificant access mode for these retired readers. Two valuable resources for blind and partially sighted persons were used by the one blind man and a visually impaired woman. The Talking Books, sponsored by the Virginia Commission for the Blind, and the Virginia Voice for the Print Handicapped, were considered excellent alternative ways of enjoying literature, poetry, news, and feature topics. The former involves recorded literature, while the latter offers special radio broadcasting of current news, features, and literature.

For the subjects in this study, cost was not a factor in access to reading materials. Five people mentioned that cost did affect the purchase of books; however, three of the four understood price in the context of increased publication costs. Paperback books were seen by some as a great contribution to readers.

Sharing Reading:

In describing a model reading program for nursing home residents, Gentile and McMillan (1979) recommended twice weekly discussion groups and volunteers to assist reading. They further suggested that literary experiences be directed toward developing self-worth, and physical and mental well-being. Lovelace (1976) and Wilson (1979) designed activities to enhance the lives of older citizens in a nursing home and retirement center. Both suggested that sharing reading appeared to be more social than intellectual and that highly-structured group activities were rejected by their subjects. The present survey of active retired readers supports the conclusions of Lovelace and Wilson.

Books were shared by the subjects in a fairly intimate manner, primarily with friends (67%) or relatives (57%). Four individuals participated in a monthly reading group, although interest in reading groups in general was not strong. A common view expressed was that it was difficult to find someone with exactly the same interests and tastes.

Physical Factors Influencing Reading Habits:

Serious visual problems were the most frequent deterrents to reading and included such debilitating conditions as cataracts, glaucoma, severe deterioration, and total blindness. Other chronic visual problems reported were dissatisfaction with small print, eye fatigue, and need for more light. Sloane and Kraut (1975) have emphasized the need of older citizens for increased light citing the miosis of pupil growth and the yellowing of the chrystalline lens as aging progresses. Compensatory behaviors to accommodate vision reduction included the use of magnifying glasses, large print materials, audio materials, and skimming and scanning techniques in addition to the use of reading glasses.

Four subjects observed that their reading pace was getting slower and that they tired more easily. Three women complaine that it was difficult to read "big heavy books" which were uncomfortable to hold. Arthritis appeared to have mixed influences on reading habits. Two subjects remarked that it was difficult to walk to the library because of an arthritis condition; while two women felt that reading helped them to pass the time and to cope with the pain experienced with this ailment.

Purposes and Values of Reading:

The purposes for reading for an older active reader do not appear to differ from adult readers in general. Eleven subjects in this study stated that they read primarily for pleasure and entertainment. Thirteen readers cited informational motivations for reading. Two questions were asked of the subjects concerning values in reading: (1) What makes a book good for you? and (2) What is it about reading that has enabled you to sustain interest in it?

Responses to the first question include appreciation of writing style (38%), an engrossing subject or topic (48%), and well-developed characters (14%). Two people mentioned action as an important ingredient in a good book. Four readers indicated that the physical properties of books, such as paper quality, binding and print size also contributed to their enjoyment of a book.

The question of reading as a sustained pastime elicited the most emotional responses, which were difficult to classify specifically. Vicarious experience through books was illustrated by comments such as, "I play all the leading characters" and "It takes me into another world." Companionship and need fulfillment motivations were expressed in statements such as, "It's a friend" and "I can be by myself and feed my own needs." Curiosity about human behavior was suggested in the following comments: "It's the best way to relate to human experience"; "I am interested in people and what they have done." Other values expressed suggested that some life-long readers are curious about scientific phenomena and the human condition throughout history. Several subjects felt that one was born with the tendency to be a reader—"It's in your blood."

Summary

Although conclusions about older active readers based upon this study are tentative until validated by a larger sample, several characteristics appear to be quite consistent across a range of educational levels:

- Active readers in retirement started reading early under the support and guidance of family.
- Good readers are aware of literary resources and continue to enjoy preferred types of materials.
- They add new types as environmental influences change and discard other types of materials which no longer have relevancy for them.
- Reading for these people is personal and most are quite content with a minimum of social interaction related to their reading.
- As a group, these readers were articulate, alert, and mentally active.
- They maintained a sense of humor and had other interests to compliment reading.

Kingston (1981) was correct to question those gerontologists who feel that active participation in social groups is a better predictor of adjustment than the more solitary activity of reading. For the readers in this study, reading appeared to be a concommitant of good adjustment and good mental health.

REFERENCES

De Santi, R. The older reader: An investigation of the reading habits and interests of four persons sixty years of age or older. *Dissertation Abstracts International* 37/08-A, 1976, 4719.

De Santi, R. Cue system utilization among older readers. *Educational Gerontology*, 1979, 4, 62-82.

Gentile, L. & McMillan, M. Reading: A means of renewal for the aged. *Educational Gerontology*, 1979, 4, 215-222.

Harris, L. & Associates. Myth and reality of aging in America. Survey conducted for the National Council on Aging, Washington, D.C., 1975.

Harvey, R. & Dutton, D. Reading interests of older adults. *Educational Gerontology*, 1979, 4, 209-213.

Kingston, A. Reading and the aged: A statement of the problem. *Educational Gerontology*, 1979, 4, 205-207.

Kingston, A. Does literacy really enhance the lives of the elderly? *Reading World*, 1981, 20, 169-172.

Lovelace, T. Reading activities to enhance the lives of nursing home patients. *Educational Gerontology*, 1979, 4, 239-243.

MacLean, M. & McLean, M. J. Phase II of reading and the elderly: Toward a conceptual model of value of reading. Department of Health, Education, and Welfare, NIE, 1979, ED 186 849.

Moshey, K. The retired adult reader: His reading interests and choices and the readability levels of them. M.Ed. Thesis, Rutgers University, 1972, 130 p. ED 064 674.

Ngandu, K. & O'Rourke, B. Reading attitudes, habits, interests, and motivations of the elderly. 23rd Annual Conference, College Reading Association, Boston, Massachusetts, November 1-3, 1979, ED 181 416.

Ribovich, J. & Erikson, L. A study of lifelong reading with implications for instructional programs. *Journal of Reading*, 1980, 24, 20-26.

Sharon, A. What do adults read? *Reading Research Quarterly*, 1973-74, 9, 147-169.

Sloane, A. & Kraut, J. The pleasure of reading need not diminish with age. *Geriatrics*, 1975, 30, 117.

Watson, D., et al. Describing and improving reading strategies of elderly readers. The University of Missouri, Columbia, HEW, Administration on Aging, 1979, ED 182 724.

Wilson, M. Future shock and the aged: Is reading a cure or part of the problem? Paper presented at the 27th Annual Meeting of the National Reading Conference, New Orleans, Louisiana, Dec. 1-3, 1977, ED 150 565.

Wilson, M. Enhancing the lives of the aged in a retirement center through a program of reading. *Educational Gerontology*, 1979, 4, 245-251.

Wolf, R. What is reading good for? Perspectives from senior citizens. *Journal of Reading*, 1977, 21, 15-17.

actively even with the obstacles presented by age. Such provocative and productive research deserves to be continued.

REFERENCE

[1]Duncan, P. H. and Goggin, W. F. Reading habits, patterns, and interests of older active readers. Paper presented at the Second Annual Meeting of the American Reading Forum, Sarasota, Florida, December 1981.

THE OLDER ACTIVE READER: A COMMENTARY ON DUNCAN AND GOGGIN

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The interview research reported by Duncan and Goggin[1] is both important and interesting. The number of elderly Americans continues to increase and providing for their welfare is a problem which looms larger with each passing year. By applying our knowledge of the reading habits and behaviors of elderly and retired readers, we can take positive steps toward two important ends:

1. We can better predict our own behavior during our retirement years and thus prepare for our own retirement.
2. We can improve the lot of our present senior citizens by making it easier for them to pursue the habit developed from a lifetime of reading.

The finding that all read daily except for the blind person (who therefore listened to "talking books" and hired readers), suggests that retirement villages and nursing homes should have bookstores, book exchanges and/or bookmobiles to guarantee that a supply of books remains available to the elderly. And, since nearly all read a newspaper each day and most read magazines regularly, these materials also should be easily accessible (at minimal cost to those on retirement incomes). Since many enjoyed rereading a book read earlier, even during childhood, the book supply should include some of the classic children's books *of the time period when the retirees were children.*

Since the subjects enjoyed discussing their reading with close friends and with relatives, but usually did not want to participate in organized book discussion groups, it would be appropriate to suggest that friends and relatives first read the books they plan to give or lend to the elderly. By so doing, they can become discussants of the type most preferred by older persons—a relative or close friend.

Difficulties in vision were reported by a number of the interviewees. These can be ameliorated somewhat by providing brither lighting, magnifying glasses, and/or large type books. However, the problem which holding a book presents for the arthritis victim seems much larger to solve. Perhaps computer-controlled text printed on a large screen could provide reading material adjusted to the arthritic reader. Or perhaps microfiche readers could help. As our technology improves, the needs of our older citizens should not be forgotten as we find applications for it.

The finding that the reading patterns of old age were extensions of patterns formed during earlier years is a significant one. Duncan and Goggin cited the case of the mothers who develkoped the habit of reading late at night because they didn't start until after their children were in bed, pointing out that these women continued to be late-night readers as senior citizens. It would seem that nursing and retirement homes should provide for such reading habits to continue, rather than enforcing sometimes arbitrary routines which conflict with a lifetime reading habit.

In summary, the findings of Duncan and Goggin are sufficient to generate both greater understanding of elderly active readers and some research into ways in which they can pursue reading

READING HABITS AND PATTERNS OF ENTERING COLLEGE STUDENTS IN STANDARD AND COMPENSATORY CLASSES

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Virginia Commonwealth University has an open admissions policy and thus admits some students with marked difficulties in reading—particularly for the types of reading required for success in college. A course offered by the Division of Teacher Education, Reading and Study Skills (EDU 100), attracts many of these marginal students. Since I teach this course fairly regularly, I have become interested in the factors which operate in these students lives (and which have operated in the past) which may be presumed to have significance for their reading deficiencies.

The purpose of this paper is to explore the reading habits and patterns of students enrolled in the Reading and Study Skills course, certain demographic characteristics of the group, and to compare them with a group of students with adequate to above adequate reading ability (i.e., students enrolled in English 101, Composition and Rhetoric. Seventeen students in the Reading course and sixteen in the freshman English course were interviewed using an adaptation of an instrument designed by Duncan and Goggin (1981) for exploring the reading patterns of elderly readers. The students were interviewed individually and, in the case of the Reading students, responses were taped as well as written by the author. The noise conditions under which the English students were interviewed made taping impractical, so their comments were written only. The interviews took approximately twenty to twenty-five minutes and the Duncan and Goggin framework was not rigidly followed. That is, if the interview took an unexpected but apparently promising turn, the serendipity was exploited. New factors were identified in this way and questions relating to these factors were incorporated into subsequent interviews. Thus, while all students were asked a nucleus of questions, some students responded to additional inquiries. The interviews were held during October and November of this year. No statistical manipulations of the data were attempted. Rather, the study sought to highlight salient contrasts between the two groups which are hypothesized to relate to reading.

Demographic Characteristics

There were marked demographic contrasts between the two groups of students reflecting ethnic and, probably, social class differences (although SES data *per se* were not available).

The students in the English course were predominantly female, aged eighteen or nineteen, white and from outside the Richmond area. All but one were single and all but two had enrolled in college immediately following high school. All were full-time students, all were freshmen, and about two-thirds had no outside employment. Approximately two-thirds of these students planned to major in art or in art-related fields. Of the students in the Reading course, six were males. The students were older than their English course counterparts (about half of them were over nineteen) and about half of them had not proceeded to college directly from high school. Two-

thirds of the Reading course students were black and three-fourths of them were from the Richmond area, lived off campus, and all but four of the seventeen were working in addition to studying. These students were equally divided between freshmen and sopbomores and included one junior. Two-thirds of these students planned to major in business or business-related subjects.

An interesting contrast between the groups emerged in the matter of career goals, with the English students demonstrating considerably greater specificity in this regard. Goals such as "theatre therapy, designing book covers, designing industrial interiors, medical illustration, editing a fashion magazine" were reported. The reading course students showed less clearly articulated goals. Responses such as the following were elicited: "To do better; to get a good job in sales; to be a business executive; to be in politics; to work in information systems;" although several responses were quite specific. It would appear that students in this course do not simply need help in reading. It would also seem likely that a good way to approach their reading instruction would be through materials exploring the world of work, particularly materials relating to the students' career choices.

Virtually all the students interviewed reported having avocations, usually several. About two-thirds of the English students had hobbies that were related to their career goals, while only one-eighth of the Reading students had hobbies related to their career aspirations. Thus, the English students reflected an integration of career and lifestyle, while work and recreation were apparently dichotomized by the Reading students. It is interesting, though somewhat disheartening to note that reading was named as a hobby by only five students.

Neither group was notably involved in organizations either on or off campus. Studies and jobs apparently had greater salience for these students at this point in their college careers.

During the course of interviewing, the matter of parental reading practices surfaced and from then on was included in subsequent interviews. In any extension of this study, it would be well to explore the students' perceptions of their parents as readers, but, on the basis of the fragmentary data gathered here, the English students were more likely to report that their parents were readers, that children's books had been available to them and that their parents had read to them when they were children.

Reading Patterns and Habits

Virtually all the students in both groups reported that they read now. But their comments about their reading differed. Students in the English course were apt to proffer the titles of favored books: *Steppenwulf, Forever Amber, The Invisible Man, The Women's Room*, and favorite authors: Gibran, Rand, Faulkner, Tolkien. In no case did the Reading students advance books or authors.

Responses to the second question relating to students' routines for reading displayed more similarity than disparity. More students in English, however, would be considered moderately heavy readers (reading more than two hours per day).

With regard to the variety of materials read, students in the education course were more likely to read the newspaper than were the English students, though this may have been an artifact of the study—the English students being dormitory dwellers without ready access to newspapers. Both groups of students are magazine readers. All but one of the English students reported reading magazines as did about half of the Reading students, but the latter were more likely to report themselves as "occasional" readers. Both groups cited magazines more frequently than other types of reading material. While there was some overlap between the magazines named as favorites (*Cosmopolitan, Ebony, Essence, Glamour, Newsweek* and *Time*), students in Reading cited *Black Collegian, Business Week, Richmond, Lifestyle,* and *Sports Illustrated*, while students in English named *Biology Digest, Family Circle, Life, Madamoiselle,* and *Smithsonian.*

English students were more likely to read books and to mention specific titles. The Reading students, when asked if they read books, responded in terms of textbooks. The English students apparently didn't think of mentioning texts when asked about their reading.

Another dimension explored in the study was the consistency of reading interests over time. Differences between the groups in this aspect were not striking. Reading students divided about 50/50 on whether their reading interests had changed or remained constant. Of the English students, one-third reported that their interests were long-standing, while two-thirds reported changes. Changes were generally in a positive direction and reflected an increased desire to read as a pastime and an appreciation for the "meatier" materials of high school and college. When asked if their choice of career had affected their reading habits, only about half of the English students responded affirmatively, while three-fourths of the Reading students acknowledged the impact of career, e.g., "I certainly wouldn't read economics and accounting except for my career." The impact of college on these students' reading was less than happy according to their comments. "Boring courses like philosophy don't exactly motivate you to read." "College has made me read more, but like it less."

When asked to tell what they found valuable about reading, the English students responded with slightly more comments than did the Reading students, but their comments were more varied, more difficult to categorize and reflected a more individualistic perspective on reading. These students apparently marched to their own reading drummers. For both groups, reading for information was the most prevalent value cited (by almost half the students in each group). The value of broadening one's perspectives was the second most frequently named by both groups—a close second for the English students, a distant second for those in Reading.

When asked where they obtained their reading materials, the English students cited a wider variety of sources and were less likely to report difficulty in getting access to materials. The university library received several negative comments from both groups (one Reading student complained, it was "too quiet") but in general was found to be adequate.

The effect of the current price of reading materials was the next area explored. Of the 16 English students, seven said that cost was a factor, while only three of the reading students answered similarly. It is interesting to speculate as to why these students should find cost so negligible. Is it because they live at home and have access to parents' materials, or is it because they do little reading outside of the newspaper and assignments?

All of the reading students reported discussing their reading with other people at least sometimes and most of the English students did so, too. The Reading students were most likely to share with their families, than with friends and classmates. The English students (mostly living away from home) sought out their contemporaries (friends and classmates), but also cited family members as those with whom they shared their reading.

Similar responses were made by both groups with regard to physical obstacles to reading. Only two such problems surfaced: fatigue and visual difficulties and these were cited by a minority of both groups.

Most students did report that there were other barriers to their reading, however. For both groups, lack of time was the number one problem, but it was cited more frequently by the English students. The Reading students reported many more barriers to reading, including reading difficulties *per se* and problems with concentration. These were not mentioned by any of the English students.

Among the more interesting findings of this study were the

suggestions students made for facilitating their reading. Both groups requested more interesting assignments, more interesting lectures and an earlier start on required reading. The English students pleaded for multiple copies of books in the library and advocated *more* required reading in college. Their Reading course counterparts asked professors *not* to overload them with required reading, requested a quiet place for study and courses in reading improvement.

The responses of students in developmental reading reveal some disadvantages beyond the university's purview but there are several areas in which positive steps could be taken. Students with marginal reading skills should have reading instruction related to their career goals and in materials related to their required and major courses. They should be encouraged to devote a greater proportion of their time to reading and to go beyond the daily newspaper for pleasure reading. Care should be taken to indicate the relevance of required readings and to give some attention to students' interests where possible. Pleasurable aspects of reading should be highlighted. The practice of sharing reading was valued by the students and opportunities to do so should be built into their courses. It may never be that these students, entering college with marginal reading skills, will find the demands of college reading easy to meet, but it by no means appears that the university's effort is "too late." It should not be "too little."

REFERENCES

Anders, Patricia, L. and Gwinn, Paula B. Self-perceptions and reading habits of adolescents, college students and adults. In P. David Pearson and Jane Hansen (Eds.). Reading: disciplined inquiry in process and practice. *Twenty-seventh Yearbook of the National Reading Conference,* 1978, 202-205.

Book Industry Study Group, Inc., The. *The 1978 Consumer Research Study of Reading and Book Purchasing.* Darien, Conn.: Yankelovich, Skelly and White, 1978.

Cole, John Y. and Gold, Carol S. (Eds.) *Reading in America 1978.* Washington: Library of Congress, 1979.

Duncan, Patricia H. and Goggin, William F. Reading habits, patterns and interests of older active readers. Paper presented at the Second Annual Meeting of the American Reading Forum, Sarasota, Florida, December, 1981.

Guthrie, John T. Why people (say they) read. *The Reading Teacher,* March, 1979, *32,* 752-755.

Irwin, Judith W. College readers' mental imagery, reading ability and attitude toward reading. *Reading Improvement,* Summer 1979, *16,* 124-129.

McCreath, Ethel E. An investigation of reading habits, reading interests, and their relationship to reading improvement of students in an urban opendoor junior college. In George H. McNinch and Wallace D. Miller (Eds.) Reading: convention and inquiry. *Twenty-fourth Yearbook of the National Reading Conference,* 1975, 100-105.

McEvoy, George F. and Vincent, Cynthia S. Who reads and why? *Journal of Communication,* Winter, 1980, *30,* 134-140.

Schweitzer, John C. Newspaper readership interests of the young. Paper presented at the Annual Meeting of the Association for Education in Journalism, Madison, Wisconsin, August, 1977.

Smith, R. Kent, Drummond, Robert J., and Pinette, Clayton A. Reading attitudes and interest: their importance in community college reading instruction. *Reading World,* October, 1975, *15,* 38-44.

Vsova, George M. The effectiveness of a college freshman reading-study skills course. *Reading Improvement,* Fall, 1979, *16,* 190-191.

Windhauser, John. Repeated readership. *College Press Review,* Spring, 1981, *20,* 90-91.

READING HABITS AND PATTERNS OF IN-SERVICE READING TEACHERS IN PUBLIC AND PRIVATE SCHOOL SETTINGS

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The model of literacy presented by the regular classroom teacher is highly suspected to be a major factor influencing students' behavior as they are taught to read. Teachers who present a literate model to which their students can aspire often influence the subsequent reading behavior of their students. The result is that students can readily deduce that reading is not simply a school tool, but a skill needed for life long survival. Given this information, a survey of regular classroom teachers' reading habits seems an appropriate vantage point for beginning to think about both pre-service and in-service training which will include insurance that the products of our teacher training institutions will at least be literate.

As early as 1973, Zahorik warned of the possible relationship between the teacher's own reading values and the achievement of his/her students. Speaking somewhat disparagingly, he wrote, "By their own attitudes and behaviors some teachers communicate to students that reading is an unimportant activity . . ." (Zahorik, p. 56). Cogan (1975) subsequently studied elementary school teachers and concluded that they did little professional reading and that those journals which they did read were most often of a pragmatic nature. More recently, Joseph and Polonsky surveyed both secondary teachers and elementary teachers and concluded among their findings that elementary teachers spent more of their leisure time activities listening to the radio or viewing T.V., as opposed to reading (Joseph & Polonsky, 1981, p. 15). If such a dismal picture exists as a matter of fact among elementary school teachers of reading, can in-service or pre-service offer a remedy?

This present research was designed to survey the reading behavior of elementary school teachers also involved in supervision of practicum students who were enrolled in reading course work leading to initial certification as elementary teachers in grades N-6. Following the survey, the results were examined against the questions posed by Rath to determine if individuals valued reading (Rath, 1966, p. 27). This plan was employed as a means of collecting the desired data with some degree of indirectness, while at the same time testing the validity of the instrument used. Asking teachers questions in a more direct manner might facilitate teachers who, like their students, have learned to supply the "right" answer.

In order to accomplish this design, 38 male and female classroom teachers of reading were asked to respond to a modified version of the questionnaire designed for the study by Joseph and Polonsky (1981). Those individuals choosing to respond to the questionnaire were regular classroom teachers who taught all subjects in addition to reading to children in grades 1-2, in both public and private school settings.

One hundred and twenty questionnaires were distributed to those students who were engaged in course-related field work in reading during the early days of October, 1981. Of those teachers approached, eighty-two or, 68 percent, refused to respond. The most often given reason for their refusal had to do with their doubts relative to the subjectivity of the survey instrument. One prospective respondent was heard to reply, "It's just another way to establish that we are illiterate, and I simply will not do it." The thirty-eight, four male, and twenty female, who did agree to respond represented a return of thirty-one (31) percent. Of the thirty-eight completed surveys, fifty-five (55) percent were college graduates, and fourty-four point seven (44.7) percent had attended graduate school. Sixteen, of forty-two (42) percent, of these were married without children,

while fifteen, or thirty-nine point four (39.4) percent, were married with children. Fourteen, or thirty-six point eight (36.8) percent, taught in inner-city schools, and twenty-four, or sixty-three point two (63.2) percent, were surburban teachers.

Analysis of the data according to the stated plan suggests the following:

In response to Rath's first criterion, "Do you choose freely to read?", item 1 of the survey questionnaire was used to generalize about teachers' responses. In this respect, the largest number of respondents listed their reasons for reading as being for recreation, professional development, and information about current events, and in that order.

In response to Rath's second criterion, "Do you choose reading from among alternatives (such as T.V., movies, cards, and so forth)?", item 12 of the survey questionnaire was used. Fourteen, or thirty-six point eight (36.8) percent indicated that they spent the major portion of their leisure time watching T.V., while eleven, or 28.9 percent chose to read. This finding is not unlike that reached by Mueller (1973) who determined that the teachers she studied placed a similar low value on reading as a leisure activity. It also represents a similar conclusion drawn from the work already mentioned in the reporting by Joseph and Polonsky (1981, p. 16). In their study, they indicated that elementary teachers spent most of their time watching T.V. as opposed to reading. In this study, as with the study above, teachers chose to watch T.V. because they said, "It freed them to do housework and other things at the same time."

In response to Rath's third criterion, "Do you choose reading thoughtfully with knowledge of the consequences of each alternative?", items 2 through 11 of the survey questionnaire were employed to generalize about possible teacher responses. According to the survey, most of the respondents read between three and four magazines per month while twenty-two, or fifty-seven point nine (57.9) percent read from one to ten books monthly. Nine, or twenty-three point seven (23.7) percent admitted to reading from eleven to twenty books monthly. Two male and one female said that they had read more than fifty books during the last six months, while only two respondents read as many as eight different magazines during the same time period.

Of the types of books read, short stories, language, books of fiction, books about sex, health and text books were chosen by more than eighty (80) percent of all surveyed. Closely following these choices were preferences for books relative to the social sciences, seventy-three point three (73.3) percent; The Bible, seventy-one (71) percent; mysteries, seventy-one (71) percent; autobiographies, seventy-one (71) percent; general references, seventy-one (71) percent; and books about history and geography, sixty-seven point five (67.5) percent. This would seem to concur with the possibility that teachers read to support their professional growth even during their leisure time, a conclusion also researched in a similar study of elementary teachers by Mour (1977).

The above data would suggest that teachers choose their reading with some concern for job related utility. While only fourteen, or thirty-six point eight (36.8) percent of the respondents admitted to spending as much as five or more hours for reading for pleasure per week, and eight, or twenty-one (21) percent said that they spent five hours or more for work related reading, there is little to suggest that teachers of elementary school children spend a great deal of time reading quality literature or professional books and magazines. While this sample was small, it seems difficult to conceive of only three teachers who regularly read either, *The Reading Teacher* or the *Journal of Reading.*

To respond to Rath's criterion, "Do you prize reading—hold it dear?", data generalized from the results of items 2 and 10 of the survey questionnaire were utilized. According to the information taken from these sections, only ten (10) percent of the teachers surveyed belonged to book clubs. The small number together with the lack of membership in professional organizations related to reading offers little ground to declare that teachers in this study valued reading according to this specific criteria.

In response to Rath's fifth criterion, "Are you glad to be associated with it—do you publicly affirm your attitude towards reading?", data from items 5 and 10 of the questionnaire were used. This data also supported the conclusions reached in the fourth criterion discussion. Seventy-three point five (73.5) percent of those surveyed said that they read one or more professional magazines such as those from the NEA, but only three respondents mentioned reading either *The Reading Teacher* or the *Journal of Reading.* Five, or fourteen point eight (14.8) percent of the respondents named other professional magazines. Since membership in professional organizations is a form of public affirmation of an individual's beliefs and values, the respondents in this survey may be said to act in ways that do not affirm their love of reading.

Rath's sixth criterion, "Do you act out upon your choices, that is, do you fact read?", was answered using items 10 and 7 of the survey questionnaire. The respondents might well be said to read for factual acquisition. Again, the choices of books about health, text books, the preference for books about hobbies, the social sciences, history, geography, general information all indicate fact type reading. Almost eighty-nine (89) percent of those surveyed also read newspapers, local and nationwide.

Rath's final criterion, "Do you have a pattern of reading?", was answered by the data obtained from the entire survey questionnaire. The instrument readily lent itself to revealing such a pattern when the behavior of each respondent was viewed in relationship to the group. All respondents indicated a pattern of regular reading even though patterns of individual respondents differed.

The results of this study indicate that a high level of correlation may exist when the survey instrument's results are interpreted against the Rath (1966) paradigm for determining if teachers valued reading. While the survey instrument provides little information relative to the quality of what teachers commonly read, it does present evidence which suggest that socialization towards reading as one avenue of leisure time activity is evident in the lives of in-service educators.

That only twenty-eight point nine (28.9) percent of those surveyed in this study chosen reading as their preferred leisure activity concurs with the conclusion reached by similar researchers of the past. This finding is particularly disturbing when one considers that thirty-four, or eighty-nine point five (89.5) percent, listed "recreation" as their main purpose for reading. Where in-service and pre-service education is concerned, we might very well consider how this information should affect teacher training programs designed to improve the effectiveness of reading teachers.

It seems ludicrous to expect our school-aged children to develop life long habits of reading quality literature if their teachers in the early grades don't. After all, almost our entire plans for schooling depend heavily upon the powerful role of the teacher as model and chief socializer of the young. When teachers themselves do not read, it hardly seems likely that they will produce students who will.

Finally, the important role of literature, especially children's literature, in the appropriate socialization of our nation's youth is undeniable. Children, especially the poor and culturally different, still depend upon it as the only source whereby they can learn first hand of the curriculum of rules and regulations which govern our societ (Jackson, 1968). If teachers of these youth show students by their action that they place a low value on this important medium, where else can we turn to assure improved national literacy and life long habits of reading among all of our people?

REFERENCES

Cogan, John J. "Elementary Teachers as Nonreaders." *Phi Delta Kappan*, Vol. 56 (March 1975), pp. 495-96.

Jackson, Phillip W. *Life in Classrooms.* New York: Holt, Rinehart and Winston, 1968.

Joseph, Karen and Polonsky, Joanne. "A Survey of Reading Habits: Elementary School Teachers vs. Secondary School Teachers." M. A. dissertation, Kean College of New Jersey. Ann Arbor, Michigan: University Microfilms, 1981.

Mour, Stanley I. "Do Teachers Read?" *The Reading Teacher*, Vol 30, No. 4 (January 1977), pp. 297-401.

Mueller, Doris L. "Teacher Attitude Towards Reading," *Journal of Reading*, Vol. 17, No. 3 (December 1973), pp. 202-205.

Rath, Louis E. and others. *Values and Teaching: Working with Values in the Classroom.* Columbus, Ohio: Charles Merrill Publishing Co., 1966.

Zahorik, John A. "Reading: The Impact of Classroom Interaction." In *Social Perspectives on Reading*, (James B. Macdonal, Ed.) Newark, Delaware: International Reading Association, 1973.

REACTION: READING HABITS AND PATTERNS OF IN-SERVICE READING TEACHERS IN PUBLIC AND PRIVATE SCHOOL SETTINGS

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Stanley Baker addresses an area that has long been a concern of reading specialists and teacher trainers, namely, what model of literacy do elementary classroom teachers provide for their students. Do teachers read?

In his attempt to measure reading behavior of elementary classroom teachers, Baker used a modified version of a questionnaire designed by Joseph and Polonsky and equated areas of response with Rath's valuing criteria. Unfortunately, Baker had difficulty in collecting data from his prospective one hundred twenty subjects. Only 31 percent of the sample returned completed questionnaires. Thus, from this small percentage of returns it would be difficult to generalize results to the larger population of elementary classroom teachers. One wonders why there was such a high rate of refusal to participate in the study and if, in fact, these teachers saw through the "indirectness" of the instrument and felt threatened.

A more complete description of the sample in terms of how the teachers were assigned practcum students might have explained teacher reluctance to participate in the study. Also worthy of consideration is the method by which the questionnaires were distributed. If practicum students approached supervising teachers with the Joseph and Polonsky instrument, did this bias teacher cooperation?

Disregarding the small percentage of subjects participating in data collection, one returns to the basic issue of what kind of a literacy model do teachers provide. Apparently, a high percentage of teachers do read for pleasure, meaning that they demonstrate a lifetime love of reading and as such should be modeling this behavior for students. The fact that a small percentage identified reading as a preferred leisure activity is not surpriing and does concur with previous research as Baker notes. Since teachers are expected to model many attitudes and kinds of behaviors for students, should they be criticized for failing to select reading as the preferred behavior?

While a study of teacher responses to a values related reading questionnaire is interesting, it might be of more value to learn how teachers utilize reading and literature in their classrooms if we wish to theorize about the models they present and the attitudes they convey.

THE STUDY AND READING NEEDS OF THE ELDERLY COLLEGE STUDENT

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Despite the fact that only a small percentage of those eligible take advantage of the opportunity, an increasing number of senior citizens are enrolling in college and university classes (Bader, 1977-78; Marcus, 1978). Generally those who take advantage of the programs tend to have higher economic and educational status than the typical older adult (Covey, 1980; Kingston, 1981; March, Hooper, Baum, 1977). Although many of the elderly who enroll in regular college and university classes had attended college years ago, there usually is noticeable time lag that must be overcome. In the State of Georgia, for example, the mean age of those attending state institutions under free special provisions, was 67.2 years (Kingston, 1981b). For many of these individuals their prior experience as college students had taken place 40 or more years before.

Not only do elderly college students have the long lapse of years as students to overcome, but age and maturity typically cause physical and psychological difficulties which serve to hamper academic adjustment. Visual and auditory problems are fairly common in persons 60 years or older. The older person needs greater light when reading or engaging in many "close vision" tasks required of the student. Fozard and Popkin (1978) note

> The illumination required for satisfactory visual functioning increases with age primarily because of normal age changes in the amount of scattering of light in the ocular media, shrinking of the pupils, yellowing of the lens, and loss of accommodation. (p. 978)

In the Georgia sample, 93% of those responding indicated they had no difficulty seeing the chalkboard and 94% indicated they had not difficulty in seeing audiovisual displays or demonstrations. A number of respondents, however, indicated that they chose seats in the front of the classroom to assure seeing what went on. Unfortunately, there is limited information concerning the effect of visual changes on the reading and study tasks faced by elderly college students. Goodrow (1975) argues that

> Poor vision was reported as the most serious constraint on the older American to reduce participation in adult learning programs. The barrier of declining visual acuity was found to be of primary concern with both male and female subjects. (p. 420)

Graney and Hayes (1976) also found that a number of elderly people felt that visual and auditory deprivation was a barrier to participation in educational programs. Considerable more research is needed in this area. In the Georgia study many more hearing difficulties were reported than visual difficulties. Although less than 17% of the elderly respondents said they sometimes had difficulty hearing the professors' lectures. Nearly 30% indicated that at times they encountered problems in hearing classroom discussions.

A number of psychological and mental factors also may affect the senior citizen's adjustment to the college classroom. For many elderly persons, the reasons for enrolling in classes is significantly different from those of younger students. Many are interested in being intellectually challenged, others are satisfying long-desired aspirations. The college teacher can err badly by assuming the motives of the elderly student are identical to those of the teenager of young adult. Similarly, it would be a grevious mistake to assume all senior citizens have similiar motivations.

Age apparently affects the memory and learning of normal older individuals. A common problem is slowness in the retrieval of information and the blocking on names of people and places. Fozard and Popkin (1978) stress:

> Age differences are most pronounced in tasks that involve the memorization of, and the accuracy and efficiency in retrieval of, unconventional configurations of familiar verbal material. (p. 981)

Although these conclusions are based upon traditional paired-associate and free-recall studies they probably apply to other verbal learning tasks as well. Studies involving the cloze procedure and discourse analysis techniques might throw some light on the relationship of this phenomenon to reading behavior.

There is some evidence that the older student may have difficulties in inputting and organizing data. Whether this condition is due to lack of familiarity and experience with such tasks or to the effects of age is not certain. It does seem clear, however, that many elderly people have difficulty in separating important and relevant information from that which is unimportant and irrelevant. Research suggests that there should be a slower presentation rate and that new concepts should be presented only after the elderly have had time to assimiliate those concepts previously taught. Typically, the elderly fail to use mediation and organizing abilities to the same degree as the younger adult. The instructor needs to structure information so as to help facilitate learning and memory. Advanced organizers might be helpful.

Many noncognitive factors may cause performance deficits in the older student. Anxiety due to the newness of the situation in which the old person finds himself, the meaningfulness of the task and the degree of concentration required affect learning. It seems readily apparent that older people are willing to engage in tasks that they deem to be interesting and relevant, while refusing to interact with those they believe to be trivial, unimportant, or lacking in intrinsic value. Educators sometimes err in believing the older learner lacks the ability to learn when in actually he or she has simply lost interest in the task or activity.

A few writers, aware of the impact of age on learning, have suggested methods of instruction designed to assure greater success (Bolton, 1978; Glynn & Muth, 1979; Woodruff & Walsh, 1975). Interestingly, the college-adult reading specialist who should have much to offer, has devoted little attention as yet to the reading-study problems of the older student. Many of the skills being taught the typical college student undoubtedly would be helpful to the adjustment problems of the older adult. Reading instructors, for example, could assist the elderly student to become aware of, and to employ, various organization aids—glosses, italicized materials, and similar typographical aids. Considerable attention could be devoted to assisting the older student to learn how to sequence the organize textual material. Instead of reading selections followed by short answer objective tests, the elderly should be given a large amount of practice in outlining and summarizing textual passages and orally presented materials. Assistance also might help the elderly to develop objectives and purposes for learning. Techniques such as the survey, question, read, recite, review procedure may help the elderly student in better organizing textual material. Continued attention needs to be devoted to helping the elderly to be attentive and goal-directed. The older adult, just as the younger student, needs to be constantly reminded that learning is an active process that is best accomplished when the learner is attentive and has specific goals or objectives he or she hopes to attain and concentrates on achieving them. Again, the elder student needs to be taught procedures for systematic review.

Although the majority of college students today seem to prefer a textual reading mode that involves the underlining of selected passages with magic markers, this procedure probably is not as productive or helpful for the older adult. As note taking while reading requires the selection of important facts and principles, or generalizations as well as organization of concepts, ample practice in using these skills is desirable. Flexible reading, modes of comprehending, and vocabulary improvement also would be valuable. Above all there is an urgent need for reliable and valid data concerning the reading behavior of the 60, 70, and 80 year old adult.

It has been estimated that there will be 25 million Americans aged 65 years or older by 1985. Undoubtedly, the number who enroll in institutions of higher learning will increase. Although college administrators have showed concern for the adjustment problems of many other segments of society, little has been done to study systematically the problems of the older student. Those involved in college reading and developmental study programs will find working with senior citizens a fertile field for service and research.

REFERENCES

Bader, J. E. Formal educational opportunities for elder students. *International Journal of Aging and Human Development*, 1977-78, *8*, 339-357.

Bolton, E. B. Cognitive and noncognitive factors that affect learning in older adults and their implications for instruction. *Educational Gerontology*, 1978, *3*, 331-344.

Covey, H. C. An exploratory study of the acquisition of a college student role by older people. *The Gerontologist*, 1980, *2*, 173-181.

Fozard, J. L., & Popkin, S. J. Optimizing adult development: Ends and means of an applied psychology of learning. *The American Psychologist*, 1978, *33*, 975-989.

Glynn, S. M., & Muth, K. D. Text learning capacities of older adults. *Educational Gerontology*, 1979, *4*, 253-269.

Graney, M. J., & Hays, W. C. Senior citizens: Higher education after age 62. *Educational Gerontology*, 1976, *1*, 343-359.

Goodrow, B. A. Limiting factors in reducing participation in older adult learning opportunities. *The Gerontologist*, 1975, *15*, 418-422.

Kingston, A. J. The senior citizen as college student. *Educational Gerontology*, 1982, *8*, 43-52.

Kingston, A. J. Senior citizens in the University System of Georgia, *Educational Gerontology*, 1981, 1982, *8*, 87-92.

March, G. B., Hooper, J. O., & Baum, J. Life span education and the older adult: Living is learning. *Educational Gerontology*, 1977, *2*, 163-172.

Mareus, E. E. Effects of age, sex and status on perception of the utility of educational participation. *Educational Gerontology*, 1978, *3*, 295-319.

Woodruff, D. S., & Walsh, D. A. Research in adult learning: The individual. *The Gerontologist*, 1975, *15*, 424-430.

READING ATTITUDES AND PROBLEMS OF THE ELDERLY

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In the United States the number of people 65 years of age or older is approximately 22 million, yet unfortunately little is known about their reading behavior (Kingston, 1973, 1979; Robinson and Maring, 1976). A phenomenon called "graying of the campus" has been noted since adult education programs have been booming recently throughout the nation. Reports from colleges during the last decade indicate a focus of attention on the educational and recreational needs of the eldery in the realm of higher education (De Carlo, 1974; Ellison, 1975; Stetar, 1974; Warner, 1974; Yarmon, 1980). It is therefore important for sponsors of these programs to have an understanding of the needs and attitudes of the ederly regarding reading.

As the majority of senior citizens have limited education and training in reading it is safe to assume that the elderly had adverse attitudes toward or difficulties in reading. This study was undertaken to identify some of the problems they indicated.

Method

A group of 106 elderly adults (over 50 years of age) in the Chicago area participated in the study. The group consisted of 31 males and 75 females of all socio-economic levels and varying levels of education. Some were working, others retired or semi-retired. Some were homemakers with varying amounts of work experience. Included in the study were retired university faculty and staff, senior citizen group members, friends and neighbors.

Each was administered the Survey of Elderly Reading Attitudes (SERA) (Kingston, 1981). The inventory consisted of 75 items designed to elicit attitudes, recognition and comprehension problems, different reading behaviors and physical and psychological difficulties involved in reading. Each item consisted of a statement that the respondent was to either "Agree" or "Disagree" with by circling A or D. The percentage of "Agree responses were calculated for the total group and subgroups by age, sex, and educational level.

Results

The results were compiled for groups separated by sex, age, and years of education. In general there was evidence that females read better than males, the younger group read better and had fewer physical and psychological problems with reading than the older group. The better the educational level, the better the reading skills and attitudes. There was evidence of widespread recreational reading and survival reading skills for most adults.

Of the 106 participants in this study, 93% agreed to the statement, "I can read most advertisements without difficulty." Eighty-eight percent agreed to the statement, "When reading I get a mental picture of things about which I'm reading." These were followed by agreements of 87% for, "After reading a selection I can state the main idea in my own words"; 83% for the item, "I can read the newspaper without difficulty"; again 83% for, "I can recognize most of the words I read the instant I see them"; 82% for, "I have no trouble reading printed directions when I need to"; 81% for "I can understand the marks in the dictionary which explain how a word is pronounced"; 76% for, "After I read a passage I can recall most of the important facts and details I have read."

As indicated in Table 1, there was a disparity (61%) of responses to the statement, "Reading help me not to feel lonely," between the age group 50-59 years and the 80 and over age group, with only 27% of the former agreeing and 88% of the latter agreeing.

The next greatest diffrence was for the item, "I find my attention wanders when I read", with only 18% of the youngest group and 75% of the oldest group agreeing, another large difference (57%). The next item shows that as people grow older they are more likely to regard a day as wasted if they don't read for at least one hour. Although it may seem contradictory, this is followed by the item which indicates that older people read only when they have nothing else to do. Next is the response which indicated that the older people think they are above average readers for their group.

Table 1

COMPARISON BY AGE GROUPS

		Percentages				
Item		**50-59**	**60-69**	**70-79**	**80-89**	**Diff.**
15	Reading helps during loneliness	27	62	81	88	61
4	Attention wanders while reading	18	32	24	75	57
24	Regard day wasted if they don't read for at least 1 hr.	23	29	56	5	52
13	Read only when there's nothing else to do	23	32	29	75	52
42	Recreational reading above average for age group	23	47	49	75	52
32	Frequently overlook words	14	35	32	63	49
61	Skip words they don't know	27	27	27	75	48
16	Don't like violent or sexy novels	41	71	81	88	47
8	Print blurs after 15-20 minutes	5	12	12	50	45
33	Frequently miss or reread a line	18	21	44	63	45
51	Takes above average time to locate telephone number in book	5	15	20	50	45
43	Often miss the point when reading	5	15	17	50	45
36	Can recall most facts and details	91	71	76	50	41
35	Self-conscious about reading aloud	23	35	32	63	40
68	Friends and family interested in material read	64	41	54	25	39
37	Can paraphrase the main idea	100	85	85	63	37
18	Reading has increased	27	41	73	63	36
20	Enjoy rereading stories read before	27	24	49	63	36
21	Reading stories they didn't recognize before	14	27	34	50	36
50	Have a current library card	59	50	37	25	34
47	Have difficulty concentrating while reading	5	21	32	38	33
62	Spell out words they don't know	18	29	37	50	32
71	Read Bible more frequently than when younger	18	21	44	50	32
3	Do not read as widely as before	32	47	39	63	31
1	Read more slowly than before	23	32	49	50	27
66	Read only when there's nothing better to do	23	21	42	50	27
5	Read newspaper without difficulty	100	79	81	75	25
6	Read advertisements without difficulty	100	100	88	75	25

Other differences indicate that the oldest group frequently overlook words; more often skip words they don't know; don't like violent and sexy novels as much as the younger groups. The print often blurs for them after 15-20 minutes of reading; they take more time to locate a number in the telephone book; they have difficulty recalling the facts and details; they are more self-conscious about reading aloud. Their families and friends are less interested in what they read; they are less able to paraphrase the main ideas, they read more than they did when they were younger. The oldest group is also more likely to reread stories they have read before; they are less likely to have a current library card; they have greater difficulty concentrating; they tend to spell out words they don't know; they read the Bible more frequently; they read more widely; they read more slowly; and they have more difficulty reading newspapers and advertisements.

Comparison of responses of 31 males and 75 females where there is a disparity of 10% of more revealed the following types of data. The greatest difference (32%) is for the item, "I can understand directions for filing tax returns without seeking help", 68% of the males responded "agree" while only 36% of the females responded "agree". This can be related to the image portryed by the media and advertisements. Other responses indicate that in general males read fewer books, read less fiction, read slower than when younger, prefer larger type in newspapers, have difficulty reading print on glossy paper, don't get family or friends involved in what they read, don't prefer violent and sexy novels, don't subscribe to many magazines, often don't believe printed materals. In contrast, females usually read more books, read more fiction, don't read slower than when younger, don't have as much difficulty reading print on glossy paper, get family and friends involved in what they read, prefer violent and sexy novels, subscribe to more magazines, more often believe printed material.

Table 2 is a comparison of responses by educational level of the participants where there is a disparity of 25% or more.

Table 2

COMPARISON BY YEARS OF EDUCATION

		Percentage			
Item		**0-11**	**12-15**	**16+**	**Diff.**
30	Often don't know words in newspapers	55	39	8	47
50	Have a current library card	24	47	69	45
13	Read only when nothing else to do	48	37	5	43
38	Say most published material not worth reading	69	43	26	43
35	Self-conscious about reading aloud	59	24	22	37
61	Skip unfamiliar words	45	31	9	36
40	Can understand directions of tax returns	31	43	66	35
7	Can read governmental forms	31	61	65	34
32	Frequently overlook words	52	28	18	34
66	Read only when nothing better to do	41	37	8	33
64	Read all material at same rate	55	39	22	33
49	Know how to use library card catalog	59	61	92	33
27	Subscribe to daily newspaper	51	49	83	32
4	Attention wanders while reading	51	20	26	31
33	Frequently miss or reread a line	48	31	18	30
60	Can understand dictionary pronounciation key	66	84	95	29
43	Often miss the point of material	28	18	0	28
16	Don't read violent or sexy novels	79	73	52	27
36	Can recall facts and details	66	73	92	26
51	Difficulty in locating number in telephone book	31	16	5	26
62	Spell out unfamiliar words	48	26	22	26
53	Subscribe to two or more magazines	48	67	74	26
68	Friends and family are interested in their reading	35	49	61	26
21	Read stories that were not recognized at first	38	28	13	25
28	Go to public library at least once a month	14	22	39	25

The greatest difference was for the item, "I often find words in the newspapers whose meaning I don't know." This was agreed to by 55% of the less educated, those with 0-11 years of education and only 8% of the most educated group with 16 or more years of education.

Discussion

The results of this study suggest that most of the mature adults who filled out the inventory considered themselves good readers. The statements with the highest percentage of agreement were all very positive in nature and indicated no difficulty in reading or understanding a variety of the usual types of materials such as newspapers, advertisements, and directions. When the group was divided into subgroups, however, on the basis of age, sex, and educational levels, it was found that there were some very great differences among these older people.

When the elderly are separated into ten-year age groups, starting at fifty years of age and above, there were twenty-eight items in which the difference between the youngest and the oldest group studied were twenty-five percent or greater. These differences have important implications and offer insight for the teacher, counselor, and administrator. There were larger differences between the age groups than between the sexes or educational levels. The greatest difference between the youngest and oldest group was sixty-one percentage points for the item, "Reading helps me not to feel lonely." It may be that the younger group have more friends, activities and are more

likely to have a marriage partner.

The findings for the age groups further indicate that in general, reading skills such as understanding the main idea, remembering the important facts, skimming and scanning, general comprehension, rate and concentration, all diminish with age. Reading is also a means of overcoming lonliness, and filling idle-time, a form of recreation and relaxation. One may also conclude from these findings that vison and the cognitive processes are also declining for most elderly subjects, also that the main differential in reading habits of the elderly is age followed by educational level, then by sex.

Another finding was that there were twenty-four items with 10% or more differences between male and female responses. It was also apparent that although these differences were important, they were not as great nor as many as the differences between age or education. The greatest difference between males and females was thirty-two percentage points for the item, "I can understand directions for filing tax returns without seeking help", which may reflect an experience factor.

These findngs also indicate that females read more than males, especially fictional material and magazines, they appear to be more facile readers. They use the library more frequently and are more knowledgeable about the library and reference material than males. This is in keeping with the literature and may be due partly to the fact that they have spent more time in libraries and reading recreational material than males who generally spend more time in their occupations. An unexpected finding was that females preferred violent or sexy novels more than males.

A final finding was in the differences noted between respondents according to educational levels. It was found that there were twenty-five items with a difference of at least 25 percentage points between highest and lowest educational levels. The greatest difference was forty-seven percentage points, which was for the item, "I often find words in the newspaper whose meaning I dont know."

The findigs corroborate what one might expect—that more education contributes to a better vocabulary, better reading habits and improved study skills. It also results in more and better skill in the use of library facilities, broader reading interests and greater reading flexibility. We may conclude that reading contributes more to the educational and recreational accomplishments of the aged who are better educated than to those with less schooling.

REFERENCES

DeCarlo, T. J. "Recreation Participation Patterns and Successful Aging." *Journal of Gerontoogy*, 1974, Vol. 29, No. 4, 416-422.

Ellison, J. The Do It Yourself Plan For Intelligent Citizens. *Aging*, 1975, No. 247, 9.

Kingston, A. J. Areas of concern about adult reading in P. L. Locke, (ed). *Programs and practices for college reading* (Vol. 2), 22 Yearbook of the National Reading Conference, Boone, N.C. National Reading Conference, 1973, 53-56.

Kingston, A. J. Reading and the aged: A statement of the problem. *Educational Gerontology*, 1979, 4:205-207.

Kingston, A. J. Survey of Elderly Reading Attitudes. The University of Georgia, Athens, Ga., 1981.

Robinson, R. D., and Maring, G. The aging process and its relationship to reading: A review of the literature from gerontology with implications for future research in G. McNiach and W. Miller (eds.) *Reflections and investigations in reading*, 25th Yearbook of the National Reading Conference, Clemson, S.C., 1976, 870-878.

Stetar, J. M. "Community College and Needs of Older Students." *Journal of Higher Education*, 1974, Vol. XLV, No. 9, 717-721.

Warner, J. E., (ed.) "Concerns of Elderly Prompts Educational Program in Georgia." *Aging*, 1975, No. 252, 5.

Warner, J. E., (ed.) "Senior Program in 2nd Year at University of New Jersey." *Aging*, 1974, No. 236-237, 14.

Yarmon, M. "Back to School After 50." *50 Plus*, 1980, 20:62-63.

TRAINING ADMINISTRATORS IN THE SUPERVISION OF CONTENT AREA READING TEACHERS

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This paper is one of a series of three presented at the second annual conference of the American Reading Forum. It examined eight premises for the training of administrators in the clinical supervision of content area teachers and is based upon five workshops offered in a Pennsylvania school district as part of the Content Area Reading Program (CARP).

While the primary focus of the Content Area Program, supported by an ESEA Title IVc grant, was a series of workshops designed for content teachers of grades 4 through 10, administrative personnel were trained in clinical supervision and systematic observation. This training was designed to help supervisors and administrators facilitate the implementation of CARP objectives by content teachers. While participating in the five half-day workshops, the seven principals, two teachers, and five administrators generated observation instruments that could be used in content classrooms.

A model, the Instructional Supervision Process, developed by Boyan and Copeland (1978) was adapted for use with project administrators. The model, grounded in the belief that the supervision process must be based upon a colleagial supervisor-teacher relationship, is designed to facilitate teacher self-improvement. Rather than a model for teacher evaluation, it is a practical model for face-to-face clinical supervision. Eight premises, crucial to such a model, guided the design and implementation of the five workshops. These eight premises form the body of this paper.

Many problems encountered in the content classroom can be resolved if the teacher changes his or her behavior in positive ways. Content teachers, frustrated with an ever increasing number of factors over which they have no control, often fail to recognize the influece of their behavior on the actions of students. Peer group pressure, experiential background, reading ability, preconceptions, home environment, and physical characteristics have a tremendous influence on students' classroom behavior and remain beyond the control of the content area teacher. However, the teacher does have control of his or her own behavior. In effect, many difficulties encountered as content teachers attempt to incorporate the teaching of reading skills into their content field, can be overcome by a change in teaching behavior. The content teacher's behavior is the instructional factor which the teacher can come to know best and over which the teacher can exercise the most control.

Recognition of needed change in behavior must come from within, not be imposed from without. Supervisors and administrators have traditionally had difficulty in addressing the need for change. The content teacher will not quickly integrate the teaching of reading skills into his or her content area if it is imposed by an administrator or supervisor. Commitment to change in behavior must be personally felt and must be affirmed for its worth. This is especially true for the insecure content teacher or the content teacher skeptical of the role of reading skill development in his or her content classroom.

Content teachers are often unaware of many teaching and learning behaviors which occur in their classrooms. Jackson (1968) illustrated that even good teachers, when interviewed,

express unawareness of some of their classroom behaviors and are upset by their inability to monitor their behavior. Three reasons seem to account for this lack of awareness: too much happens too rapidly in the classroom, teachers are seldom equipped with the specific skills necessary for labeling classroom behavior, and it is too diffiult to systematically observe while teaching. The content teacher, primarily concerned with management, evaluation of student responses, and communicating content material, is seldom able to effectvely monitor his or her own behavior.

Differential treatment of high- and low-achieving students is an area where this unawareness is common in content classrooms. Rowe (1969) and Brophy and Good (1970) found through systematic observation that teachers gave up on low-achieving students who had difficuly responding to questions. However, at the time they gave up on the students, the teachers did not consider this to be giving up. Expressing embarrassment over the silence and assuming that the low-achieving students were also embarrassed, thc teachers rushed forward to keep the discussion rolling. Teachers were giving low-achieving students less time to respond and thereby making a response more difficult. All of this took place without the teachers being aware of their behavior.

Increased awareness of teaching and learning behaviors in the classroom can help content teachers recognize needed changes. While much inappropriate teaching occurs because teachers are unaware of their behavior, when given specific information, teachers use that information to change their behavior and improve instruction. This is especially true if the teachers' participation is voluntary. Pambookian (1976), McNeil (1971), and Martin (1973) have shown that teachers are most likely to change when provided with information that shows a discrepancy between what they want to do and what they are doing. The goal of integrating the teaching of reading skills into the content classroom must be important to the content teacher. If the teacher finds that attention to reading skills and the reading process helps the child master the content, change is possible. In a similar manner, if a supervisor can help the content teacher identify teaching behaviors which actually inhibit the child's ability to read and understand content material, change is possible.

Existing teaching and learning behaviors can be revealed to the content teacher through systematic observation. To alter the content teacher's behavior, that teacher must be able to see what is taking place in the classroom. While observation does not automatically improve instruction, when conducted by competent persons who have a systematic method for looking into classrooms, content teachers can receive the type of feedback which can improve instruction. Eash and Rasher (1977) illustrate that an inservice program can be aided by classroom observation when the observation is specific and revolves around behavior that is of interest to the teachers.

Because it is difficult for the content teacher to apply systematic observation techniques while teaching, a trained observer is needed. Typically teachers receive information about what occurs in the classroom in a limited number of ways: student generated feedback, peer observation, self-evaluation, videotaping, and observation by a supervisor or administrator. While student feedback is useful, children are unable to objectively and systematically observe the complex interactions that occur in a classroom.

Peer observation is threatening to most teachers and presupposes that fellow teachers have both the time and the observation skills required for systematic observation. While videotaping seems to be an ideal way for teachers to objectively observe classroom interaction, the research indicates that it is effective only if specific teaching behaviors are highlighted and discussed (Fuller and Manning, 1973; Peck, 1971; Baker, 1970). Unless the content teachers know what to look for and how to observe, they are unlikely to see very much. The behavior revealed through videotaping is just as rapid and complex.

Self-evaluation is equally difficult. Teachers, as has been illustrated, are too involved in the teaching process to think about what they are doing. They have little training in systematic observation and are frequently unaware of their own behavior. While students, peers, videotapes, and self-analyses are potentially useful to a teacher, the trained observer is the logical source for information regarding classroom behavior.

The observer must present the observation results to the content teacher in a way that will allow the teacher to accept them as valid, to internalize them, and to use them to identify needed instructional changes. The traditional subjective and evaluation-laden process of supervision frequently prevents content teachers from accepting and internalizing observation results. While the literature in supervision over the last two decades has advocated a colleagial supervisor-teacher relationship and has identified equal participation by the teacher as a crucial factor in the supervision process (Cogan, 1972; Goldhammer, 1969; Sergiovanni and Starratt, 1979), the research also indicates that teachers often perceive themselves as ignored subordinates. Walker (1976), in a survey of 113 Georgia teachers, found that teachers perceived supervisors as having little respect for teachers' opinions. Supervisors were also seen as unavailable to teachers, deficient in listening skills, and unconcerned for individual differences.

The research has revealed that teachers generaly perceive the supervisor as either threatening and authoritarian or a nonentity and out of touch with classroom reality. Heald (1969) notes a comprehensive study conducted by the National Education Association (NEA) which is representative of this research. The NEA study, published in 1964, involved 600 superintendents, 800 principals, and 1000 teachers. While the supervisors perceived evaluation as valuable for the improvement of instruction, over one-half of the teachers reported that the written evaluations of their work resulted in no observable changes in behavior.

The NEA survey further reported that superintendents were the most confident of the capacity of evaluation programs to improve the quality of teaching, but teachers were the least confident. The percentage of principals who believed that evaluation programs stimuated teachers to improve instruction was nearly twice as high as the percentage of teachers who believed that improvements followed evaluation. When teachers perceive the supervisor and the supervision process to be ineffectual, it is unlikely that they will internalize the results of observation data.

The teacher will accept and internalize observation results best when there is a "no threat" relationship between the teacher and the supervisor. The discrepancy between teachers' perceptions of the supervision process and those of administrators is due, in part, to the threat generated by a supervisor in a evaluative role. Witholding tenure or dismissing a tenured teacher may be infrequent personnel actions but they become involved in the teachers' view of a principal or supervisor. There is a critical and obvious conflict between the evaluation of teachers on the one hand and stimulating professional growth on the other. Differentiating supervision to improve instruction from administration and evaluation presents a significant challenge to supervisors of content teachers.

Cogan (1976) suggests that most of what is today called supervision is heavily weighted toward general supervision, the administraton of supervision, and the rating of teachers. Babcock (1965), stating the generally held view of the Association for Supervision and Curriculum Development (ASCD), suggests that this view must change. He describes supervision as a service rather than an adminisrative function. "We have long recognized that the supervision of instruction in the classroom

should be removed from the 'authority' role. It should be removed as far as possible from the 'line-staff' relationship."

While Cogan (1976) concedes that public school supervisors are frequently charged with the responsibility for the management of programs and the rating of teachers, he contends that these roles appear to hold so much threat that it "deforms the supervisor's relationship with the teacher." The confusion of the management and rating roles with the improvement of instruction role is due to the distribution of supervisory functions among administrators and teachers and the acceptance of administrative functions by supervisors (Lucio and McNeil, 1979).

In an editorial, Unruh (1977) urges that supervision is at "a critical moment in history." Supervisors, she contends, must either rise to the challenge of leadership or lose their function to other individuals or agencies. If Unruh is correct, supervisors may begin to meet this challenge by differentiating the roles of evaluator and supervisor. The workshops conducted for Content Area Reading Program administrators were built upon the preceding premises and focused on face-to-face encounters. The role of the supervisor is not that of an evaluator. The content area teacher performs a central role in this type of supervision. Supervision becomes something that is done together; content teacher and supervisor share the expert role.

REFERENCES

Babcock, C. The emerging role of the curriculum leader. In Robert R. Leeper (Ed.), *Role of the supervisor and curriculum director in a climate of change.* Washington: Association for Supervision and Curriculum Development, 1965.

Baker, H. *Film and videotape feedback: A review of the literature.* Report Series No. 53, Research and Development Center for Teacher Education, University of Texas, 1970.

Berman, L. & Usery, M. *Personalized supervision: Sources and insights.* Washington: Association for Supervision and Curriculum Development, 1966.

Boyan, N. & Copeland, W. *Instructional supervision training program.* Columbus: Charles E. Merrill Publishing Company, 1978.

Brophy, J. & Good, T. "Teachers' communications of differential expectations for children's classroom performance: Some behavioral data." *Journal of Educational Psychology,* 1970, *61,* 356-374.

Cogan, M. *Clinical supervision.* Boston: Houghton Mifflin, 1972.

Cogan, M. Rational for clinical supervision. *Journal of Research and Development in Education,* 1976, *9,* (2), 3-19.

Eash, M. & Rasher, S. "Mandated desegregation and improved achievement: A longitudinal study." *Phi Delta Kappan,* 1977, *58,* 394-397.

Fuller, F. & Manning, B. "Self-confrontation review: A conceptualization for video playback in teacher education." *Review of Educational Research,* 1973, *43,* 469-528.

Goldhammer, R. *Clinical supervision.* New York: Holt, Rinehart, and Winston, 1969.

Good, T. & Brophy, J. *Looking in classrooms.* New York: Harper and Row, 1978.

Heald, J. Supervision. In Robert L. Ebel (Ed.), *Encyclopedia of educational research.* New York: The Macmillan Company, 1969.

Jackson, P. *Life in classrooms.* New York: Holt, Rinehart, and Winston, 1968.

Lucio, W. & McNeil, J. *Supervision in thought and action.* New York: McGraw-Hill Book Company, 1979.

McNeil, J. *Toward accountable teachers: Their appraisal and improvement.* New York: Holt, Rinehart, and Winston, 1971.

Martin, M. *Equal opportunity in the classroom,* ESEA, Title III, Session A Report. Los Angeles: County Superintendent of Schools, Division of Compensatory and Intergroup Programs, 1973.

Pambookian, H. "Discrepancy between instructor and student evaluation of instruction: Effect on instruction." *Instructional Science,* 1976, *5,* 63-75.

Peck, R. "Promoting self-disciplined learning: A researchable revolution," in B. Smith (Ed.), *Research in teacher education.* Englewood Cliffs, N.J.: Prentice-Hall, 1971.

Pincus, J. Incentives for inovation. *Review of Educational Research,* 1974, *44,* 113-144.

Reavis, C. *Teacher improvement through clinical supervision.* Bloomington, Indiana: Phi Delta Kappa Educational Foundation, 1978.

Reavis, C. A test of the clinical supervision model. *The Journal of Educational Research,* 1977, *70,* (6), 311-315.

Rowe, M. "Science, silence, and sanctions." *Science and Children,* 1969, *6,* 11-13.

Sergiovanni, T. & Starratt, R. *Supervision: Human perspectives.* New York: McGraw-Hill Book Company, 1979.

Unruh, G. Instructional supervision: Issues and trends. *Educational Leadership,* 1977, *34,* 563-566.

Walker, J. Georgia teachers list irritating supervisory habits. *Phi Delta Kappan,* 1976, *57,* (3), 350.

RESEARCH RESULTS: TEACHER CHANGE IN CONTENT AREA READING

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As described in the preceding paper by Laine, the Content Area Reading Program (CARP) has been operating through a statewide network of instructors in Pennsylvania. Because we have advocated long-term involvement as the most effective inservice education effort, we welcomed the opportunity to work with the Hollidaysburg (Pennsylvania) Area School District for a three year period (1979-82) under Title IVc funding.

The first year of training involved 25 teachers, Grades 4-10, who taught various content area subjects. Several reading specialists were included in the group. Each month two three-hour workshops were conducted. The first workshop (dubbed the "theory" workshop by the participants) was presented by one of the authors concerning two or more of the topics included in the CARP curriculum. The second workshop of the month provided work time for the teachers to apply the workshop content to their own classrooms. The reading supervisor conducted the "application" workshops with the help of the reading specialists. She also worked with the content teachers in their clssrooms, helping them to apply content area reading strategies. Laine, then as a graduate student, attended both types of workshops for teachers as well as conducted the workshops for administrators, providing the coordination among inservice efforts for the various school personnel. An optional summer workshop for teachers followed, conducted by the reading supervisor to provide additional time for materials development. A dissemination book was prepared consisting of samples of the work created by the teachers involved in the first year of training.

During the second year we again delivered the CARP curriculum to different content area teachers. The reading supervisor provided the main linkage between the "theory" and "application" workshops. The content teachers and reading specialists who participated during the first year attended some of the "application" workshops to do further materials development and serve as resources to the second-year teachers. The reading supervisor again helped the content area teachers apply what they were learning in the workshops in their classrooms.

Due to a cutback in Title IVc funding, the design for the third year had to be modified. Science and social studies teachers at the high school participated with both the "theory" and "application" workshops being conducted by the reading supervisor. The reading specialists assisted, serving as resource personnel to the content teachers. While cutbacks in funding

usually do not have positive effects, in this instance we believe it may have since responsibility for the inservice education in content area reading now belongs completely to the school district. The CARP curriculum is still being implemented, but university personnel have been phased out.

The project has also included a research effort which is described in the next section.

Project Evaluation

Initial comparisons involved the first-year workshop teachers and all other teachers in the school district, Grades 4-10. All teachers were tested at the beginning and end of the school year with two measures of attitude toward teaching reading in the content areas as well as a criterion-referenced test of knowledge of reading skills. The instruments, which are described in more detail elsewhere (Dupuis & Askov, 1977), are briefly summarized.

The first attitude instrument, the *Statements Survey,* is a twenty-item Likert scale that yields a direct measure of teacher attitude toward incorporating reading instruction in the content areas and has an estimatd reliability (coefficient alpha) of .85.

A second instument, the *Situations Survey,* is a less direct measure of teacher attitude toward content area reading instruction. This instrument, which utilizes the semantic differential technique, consists of twelve items with five sets of bipolar adjectives (such as *practical-impractical)* to be rated for each item. Each item consists of a classroom situation that a content area teacher might face and a possible diagnostic-prescriptive plan the teacher might follow in the situation described. This instrument has an estimated reliability (coefficient alpha) of .94.

Two questions using the semantic differential format and included as part of the *Situations Survey* yield two additional scores used in assessing the effects of the inservice program. The first of these scores, the Feasibility score (estimated reliability, coefficient alpha, of .86), is obtained from teacher ratings of the bipolar adjectives *feasible-not feasible* after each of the twelve items on the *Situations Survey.* This score was considered a third dimension of attitude in analyzing results.

The other score obtained from this instrument is a self-report measure consisting of teacher ratings of the bipolar adjectives *skilled-not skilled* after each of the twelve items on the *Situations Survey.* This Perceived Skill score (estimated test-result reliability of .93) was designed to measure a teacher's confidence in implementing the stated diagnostic-prescriptive plan.

To measure the cognitive aspects of the program, a knowledge-level criterion-referenced instrument was developed based on the specified required written objectives each inservice participant was expected to complete. The thirty-four item *Knowledge of Reading Skills Test* has an estimated reliability (KR-20) of .76.

Results and Discussion

Analyses of variance were performed on the difference scores between the pretests and posttests for both groups (workshop teachers vs. other teachers). These results are presented in Tables 1 and 2.

Table 1

PRE- AND POSTTEST OBSERVED MEAN SCORES

	Experimental		Comparison	
	Pretest	**Posttest**	**Pretest**	**Posttest**
Knowledge of Reading (Multiple Choice)	16.69 (N=16)	21.44	13.15 (N=73)	13.41
Statements Survey (Likert)	90.35 (N=17)	96.00	82.67 (N=73)	80.93
Situations Survey: (Semantic Differential)				
Reaction to Situations	378.69	409.31	352.31	352.75
Feasibility	68.88	79.88	67.73	68.17
Perceived Skill	68.38	78.25	63.53	62.38
Total	516.94 (N=16)	567.44	483.58 (N=64)	483.30

Table 2

ANALYSIS OF VARIANCE, TREATMENT × TIME

	df	MS	F
Knowledge of Reading:			
Treatment	1	264.54	19.62***
Error	87	13.48	
Statements Survey:			
Treatment	1	752.39	9.55**
Error	88	78.82	
Situations Survey:			
Reaction to Situations			
Treatment	1	11664.00	5.83*
Error	78	2000.00	
Feasibility			
Treatment	1	1428.05	21.32***
Error	78	66.97	
Perceived Skill			
Treatment	1	1557.60	8.83**
Error	78	176.30	
Total			
Treatment	1	34321.00	10.379**
Error	78	3307.00	

*P- .05
**P- .01
***P- .001

As can be seen, the teachers involved in the workshops gained significantly in their attitudes toward content area reading instruction and in their knowledge of reading skills and techniques. The comparison group remained essentially similar on both administrations.

It must also be noted that the first year workshop teachers scored higher on the pretest for all measures except the Situations Feasibility and Perceived Skill scores. In other words, they seemed to have felt more positive toward content area reading instruction and appeared to know more about it. However, they felt no more certain about the feasibility of actual implementation in their classrooms nor more confident in their own abilities to do so. Since they volunteered for participation in the workshops, while the comparison group did not volunteer even for testing, it is not surprising that their initial scores were higher. Differences between the two groups on the pretests were not found in the original CARP data (Dupuis and Askov, 1977), probably because the comparison group consisted of volunteers (for testing only) rather than a whole school faculty as was the case in Hollidaysburg.

As a further check on the validity of inservice training for the first year teachers, we observed their classes during the spring of the second year of the project. We believed that by then the teachers had had adequate time to implement content area reading strategies. We were satisfied that CARP objectives were being implemented in the classrooms observed.

Conclusions

Long-term involvement in inservice training in content area reading does improve not only knowledge of reading skills but

also attitudes toward content area reading. The Feasibility and Perceived Skill scores of the *Situations Survey* are particularly interesting indices of confidence that is gained through inservice training.

The role of the reading supervisor was particularly critical as she provided the main linkage between the "theory" workshops delivered by a university professor and the "application" workshops in which the teachers actually created materials incorporating content area reading strategies. Her classroom visits also enabled her to help teachers apply theory in their instruction.

The reading specialists became indispensable team members. Initially content area teachers were reluctant to ask them for help. However, through the workshops the reading specialists grew in their role as resource teachers. In spite of the Title I reading program in Hollidaysburg being primarily a "pull-out" program to provide special reading services to disabled readers, the reading specialists have now become resource personnel in assisting content teachers. Ultimately, we hope that all content teachers who have been trained will become resources to other teachers.

Teacher change is a long-term process requiring coordinated effort on the part of administrators, supervisors, specialists, and classroom teachers. The question that remains, however, is whether teacher change through inservice education has an impact on student achievement. That question is addressed in the next paper.

REFERENCES

Dupuis, M. M., & Askov, E. N. *The Content Area Reading Project: An Inservice Education Program for Junior High School Teachers and Teachers of Adults* (Final Report, Project 09-6905). University Park, Pennsylvania: Pennsylvania State University, 1977.

STUDY SKILLS: IMPACT OF A TEACHER INSERVICE PROGRAM ON STUDENT ACHIEVEMENT

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Content area reading has received renewed attention as one of the major topics in the field of reading within the last two decades. This focus on reading/study skills is the result of the recognition that the acquisition of reading skills—learning to read in developmental reading classes—does not insure the transfer of these skills to content materials (Fisher, 1974).

Many teachers are aware that poor achievement in content subjects can be related to the difficulty students experience in reading content materials. Karlin (1972) suggested that one contributor to failures is the inability of students to cope with the increasing reading demands made of them. Concerning the high school dropout problem, Rubin (1974) identified the lack of reading skills necessary for success in content classes as one of the most important factors underlying the problem. Singer (1972) also noted that the frustration experienced by intelligent students who are embarrassed because of achievement deficiencies, especially in reading, may cause them to leave school.

School personnel often analyze the scores from the customarily given standardized tests to ascertain the needs of the students. Schleich (1971) found that the scores on a standardized reading test administered as part of a school-wide program showed a significant downward trend from grades nine to twelve for the same group of students. This assessment was conducted prior to the implementation of a content area reading course for the teachers. It seemed to indicate that the higher level reading skills were not being developed.

Diem (1980) noted the dramatic decline of reading and content scores for one school district's students in grades four through twelve. This finding prompted an investigation into curricular problems, and it became apparent that the academic achievement in the content areas was being affected by low reading performance.

A number of programs have been developed to educate content teachers in devising and implementing reading strategies as a part of the courses they teach. Some of these programs are becoming part of the required curriculum for preservice teachers in an attempt to improve the preparation of these future teachers for the needs of students. Others are designed specifically for inservice teachers whose content training included little, if any, course work in the teaching of reading.

Teacher training is a necessary step for improving instruction. However, the effectiveness of a content area reading program is ultimately determined by the students' abilities to use those reading skills for the improvement of achievement in the content areas.

Lee (1977) examined the effects of a competency-based content area reading inservice program on the attitudes and knowledge of reading skills of participating teachers. The exclusion of an assessment of student achievement was cited as a limitation of the study. The reason given for excluding this area as part of the evaluation for the inservice program was that it seemed unrealistic to expect significant gains in academic achievement as the result of teacher participation in an inservice program, especially when the focus of that program is centered on measuring teacher variables related to reading instruction. The measurement of student achievement was recommended for future research because its importance as a variable in teacher education can not be overlooked.

A program designed to improve the attitudes and skills of teachers for integrating reading skils in the content areas should eventually have a positve effect on student achievement. However, the teachers involved in content area reading programs are implementing novel strategies, sometimes under observation, in situations of learning for the teachers. Although these programs are designed to give the participants time to internalize and practice the new ideas, the teachers are not able to effect an overall sequential plan of reading instruction which could be applied to their classes. The evaluation of an inservice program in terms of student achievement might be addressed more effectively in a planned follow-up study to a teacher inservice program.

This investigation was conducted to examine the effects of a competency-based content area reading project for inservice teachers on the reading/study skills achievement of students. The teachers who participated in the project completed the requirements for the inservice course during the 1979-80 school year, a full year prior to this investigation.

This study also examined the influence of the type of assessment instrument used to measure reading/study skills achievement for the evaluation of the teacher inservice project. The subjects of the study were given criterion-referenced and norm-referenced tests.

The following hypotheses were proposed for this study:

1. There will be no significant differences in the reading/study skills achievement scores of students taught by the content area project teachers and students taught by teachers who did not participate in the project, as measured by the criterion-referenced test.

2. There will be no significant differences in the reading/study skills achievement scores of students taught by the content area project teachers and students taught by teachers who did not participate in the project, as measured by the

norm-referenced test.

3. There will be no significant differences in the number of students who attain mastery level (75%) or better on the criterion-referenced test for the groups of students taught by the content area reading project teachers and those taught by teachers who did not participate in the project.

For the purpose of this investigation, reading/study skills are defined as map skills, graph and table skills, and reference skills (Kamm, 1971).

METHOD

Subjects

The subjects of this study were selected from students in grades four, five, eight, and nine of the Hollidaysburg Area School District which is located in west central Pennsylvania.

The experimental group subjects were students in the classes of teachers who participated in the first year of the content area reading project. Twenty-five teachers were initially involved in the project. One year later, however, some of the teachers had been granted leaves, made radical changes in grades taught, or moved from the district. Four of the remaining project teachers were reading specialists and not responsible for content area courses. Thus, six of the original project teachers, three elementary and three junior high, were identified and their students became the subjects of the experimental groups.

The comparison group subjects were the students of teachers who matched, as closely as possible, the project teachers on the following criteria: subject taught, grade placement, high or low achievement class, and years of teaching experience. These teachers had not participated in a content area reading course.

Procedures

Some researchers have suggested that standardized measures of general reading ability are not sensitive enough to distinguish isolated skill improvements that could be attributed to a relatively short treatment period (Jensen, 1976; Peters, Peters, and Kaufman, 1975; Singer, 1976). For this reason, only the reading/study skills achievement of the subjects will be assessed.

No attempt was made to alter the regular class assignments of students to teachers that the district normally followed. All students in the same grade are ranked by reading achievement score. The ranks are then divided into two groups from which they are then randomly assigned to teachers for the classes they need. Because of this procedure intact classes were used and the groups were compared separately for the teachers who were matched. The six classifications for the matched teacher groups were:

Elementary: fourth grade social studies, fifth grade science, fifth grade social studies

Junior high: eighth grade English, eighth grade history, ninth grade math

Instruments. The Comprehensive Tests of Basic Skills (CTBS) were administered to the subjects of this study as part of the regular testing program of the school district in the spring of 1980. The reading subtest of the *CTBS* was used as a measure of general reading ability.

In the spring of 1981 the subjects were given the *Work-Study Skills* subtests of the *Iowa Tests of Basic Skills (ITBS)* a norm-referenced test and selected subtests of the *Wisconsin Tests of Reading Skills Development: Study Skills (WTRSD)*, a criterion-referenced test, as measures of reading/study skills achievement.

Analysis of Data

A t-test was performed on the mean *CTBS* grade equivalent scores of the matched teacher group of students. The data indicated no significant differences in the general reading scores for all classifications except the eighth grade English sections. The experimental group showed a higher significant mean, $t(39)=2.69$, $p < .05$.

The data were analyzed separately for each of the subtests and the total test of the *ITBS* and the *WTRSD* per matched teacher goups with an anaysis of covariance. The raw scores on these tests were adjusted to control for general reading ability, using the *CTBS* as the covariate, in order to determine if significant diferences existed in the reading/study skills scores of the groups of students.

The fourth grade comparison group scored significantly higher on the reference materials subtests of the *ITBS*, $F(1.51)=5.18$, $p < .05$. The same group also scored significantly higher on two of the six substests and the total test of the *WTRSD:* maps—intermediate directions, $F(1,51)=6.67$, $p < .01$; indexes, $F(1,51)=8.01$, $p < .01$; total test, $F(1,51)=4.51$, $p < .05$. No significant differences were found for either of the fifth grade classes on any of the subtests or the total test.

The eighth grade English experimental group scored significantly higher on all selections of the *ITBS:* visual materials, $F(1,37)=4.91$, $p < .05$; reference materials, $F(1,37)=15.84$, $p < .001$; total tet, $F(1,37)=12.19$, $p < .001$. On the *WTRSD* the eighth grade English experimental group scored significantly higher on one of the five subtests given and the total test: graphs—multiplicative differences, $F(1,37)=9.36$, $p < .01$; total test, $F(1,37)=13.15$, $p < .001$. The comparison group for ninth grade math scored significantly higher on the schedules—problem solving subtest of the *WTRSD*, $F(1,40)=5.69$, $p < .05$.

The Chi square test was used to analyze the data according to mastery versus non-mastery on each of the subtests and the total test of the *WTRSD* for each of the teacher matched groups of students. Significant differences were obtained for the fifth grade science groups for the subtest on dictionary meanings, $X^2=10.76$, $df=1$, $p < .001$ and the total test, $X^2=4.51$, $df=1$, $p < .05$. The fifth grade social studies groups differed significantly on the point, line, and area symbols subtest, $X^2=5.38$, $df=1$, $p < .05$. No significant differences were found between the fourth grade groups on any of the subtests or the total test.

At the junior high level significant differences were shown for the eighth grade English groups on all but one of the subtests: maps—synthesis, $X^2=7.65$, $df=1$, $p < .01$; graphs—multiplicative differences, $X^2=9.16$, $df=1$, $p < .01$; graphs—projecting and relating, $X^2=4.54$, $df=1$, $p < .05$; schedules—problem solving, $X^2=6.67$, $df=1$, $p < .01$; and the total test, $X^2=9.01$, $df=1$, $p < .01$. No significant differences were found between the eighth grade history or the ninth grade math groups. Generally, there were more students in the non-mastery category for the latter two groups. On three of the subtests none of these students attained mastery.

Discussion

The findings of this study do not favor either the norm-referenced nor the criterion-referenced test for evaluating a teacher inservice program in terms of student achievement. The same groups showed significant differences for the same general skills (maps, graphs and tables, and references) regardless of the type of test. However, the criterion-referenced test had more subtests to indicate specific areas where significant differences were obtained. Also, assessing mastery can provide more direct information as to how well students (as a group) are achieving. This is especially necessary when the results of mean differences are not significant because there is no distinction as to whether the students (again, as a group) are achieving the goals set before them or not, just that the groups do not differ.

Since only one group at each level showed significant differences on more than one subtest of either type of test, no definite pattern of significant differences was established from

class to class in the elementary or junior high setting. One possible reason for this could be that reading/study skills are not emphasized as much as other areas of reading instruction. The content area reading courses for teachers usually introduce strategies for developing vocabulary and comprehension before reading/study skills possibly causing teachers to infer, incorrectly, a hierarchy inherent in these categories. Morrison (1980) found that some content area teachers did not consider the reading/study skills as important as other reading skills for their content areas. This could account for the low number of students who attained mastery in the eighth grade history and ninth grade math classes. Future research should be directed at a comparison of achievement levels of students in regard to the various aspects of reading skills as they apply to particular content areas with the amount of instructional time provided for each aspect.

One aim of the original Content Area Reading Program was to have teachers become resource persons for other teachers in the district as part of an ongoing inservice program. It seems that the 'sharing' attitude of teachers, especially on the elementary level, may account for the lack of significant differences between the groups in those classe. Some students in all of the elementary classes attained mastery on all of the reading/study skills assessed as opposed to the groups in two classes of the junior high students in which no one attained mastery on certain skills. Teachers who are encouraged to participate in providing inservice for other teachers can facilitate changes in instructional procedures which will benefit the learners.

REFERENCES

Bamman, H. A. Changing concepts in reading in secondary schools. In M. A. Dawson (Ed.) *Developing high school reading programs.* Newark, Delaware: International Reading Association, 1967.

Diem, R. H. *An analysis of a staff development training program in reading and social studies.* San Antonio: The Southwest Educational Research Association, 1980. (ERIC Document Reproduction Service No. ED 182 221)

Fisher, J. A. Improving comprehension—interpretation skills. In L. E. Hafner (Ed.), *Improving reading in middle and secondary schools* (2nd ed.). New York: MacMillan, 1974.

Jensen, B. H. *The influences of an inservice teacher training reading-in-the-content-area program on student reading achievement.* Unpublished doctoral dissertation, The Florida State University, 1976.

Kamm, K. *The study skills component of the Wisconsin Design.* Tampa: National Reading Conference, 1971. (ERIC Document Reproduction Service No. ED 055 761)

Karlin, R. *Teaching reading in the high school* (2nd ed.). New York: Bobbs-Merrill, 1972.

Lee, J. *Effects of inservice training in reading on the attitudes and skills of secondary teachers and adult basic education teachers.* Unpublished doctoral dissertation, The Pennsylvania State University, 1977.

Morrison, B. *The identification of reading skills essential for learning in seven content areas at postelementary levels* (Technical Report No. 528). Wisconsin Research and Development Center for Individualized Schooling, Madison, Wisconsin, 1980.

Peters, C. W., Peters, N. A., and Kaufman, B. D. A comparative analysis of reading comprehension in four content areas. In G. H. McNinch and W. D. Miller (Eds.), *Reading: convention and inquiry.* Clemson, South Carolina: The National Reading Conference, 1975.

Rubin, D. Inner-city high school teachers as teachers of reading: a possible solution to the drop-out problem. *Journal of Negro Education,* 1974, *43,* 337-347.

Schleich, M. Groundwork for better reading in content areas. *Journal of Reading,* 1971, *15,* 119-126.

Shepherd, D. L. *Comprehensive high school reading methods* (2nd ed.). Columbus: Charles E. Merrill, 1978.

Singer, H. Reading content specialists for the junior high school. In F. P. Greene (Ed.), *Investigations relating to mature reading.* Milwaukee: The National Reading Conference, 1972.

Singer, H., and Rhodes, A. Learning from text: a review of theories, strategies, and research at the high school level. In W. D. Miller and G. H. McNinch (Eds.), *Reflections and investigations on reading.* Clemson, South Carolina: The National Reading Conference, 1976.

SECONDARY STUDENTS' FREE RECALL AS A MEASURE OF COMPREHENSION AND EQUIVALENCY OF CONTENT AREA PARAGRAPHS

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Traditionally, the informal reading inventory (IRI) has been employed as a criterion-referenced measure of students' reading comprehension ability (Farr and Roser, 1979). The most important component of silent reading achievement evaluated is the level of difficulty of text a reader can comprehend, which can be determined more accurately via a well-constructed, well-administered IRI than by a standardized achievement test (Harris and Sipay, 1980). A student's silent reading comprehension achievement is frequently based on his ability to recall exact wording from a passage in order to answer specific literal questions. One of the most commonly-employed IRI's in university reading clinics, *The Durrell Analysis of Reading Difficulties* (Durrell, 1955) goes so far as to ask the reader to verbalize all he/she can recall from the passage. These memories are then used as a measure of silent reading comprehension.

Many reading specialists and clinicians use the IRI to evaluate students' academic achievement during a specific remediation program, utilizing paragraphs deemed "equivalent" by IRI authors to pre and posttest.

This study examines 1) the recall of exact wording from grade level equivalent IRI paragraphs by secondary students; 2) weighting of exact wording recalled by students from three content area paragraphs; and 3) the relationship between subjects (Ss) sex, grade level, serial learning ability, and exact and weighted recall of three paragraphs.

METHODOLOGY

Subjects

Forty secondary students participated in this study: 20 males and 20 females selected from grade levels nine and eleven at Acadiana High School (student population, 2,300). Homeroom teaches of students enrolled in the honors curriculum were asked to rank their students by grade point average; the top half of each group were pooled across classrooms. Random selection of 10 ninth grade males, 10 ninth grade females, 10 eleventh grade males, and 10 eleventh grade females was conducted using a table of random numbers. Scores from the *SRA Achievement Test* were available for the ninth grade students, who scored on the following subtests, according to the national percentile 72.11—Vocabulary Subtest, 77.58—Comprehension Subtest, and 76.05—Composite Reading Score.

Procedure

Ss were tested in small groups of 10 students; each of the three experimental sessions lasted approximately 45 minutes, with sessions scheduled one week apart. During the first session, students completed a knowledge inventory designed to determine self-assessed knowledge of specific topics listed by the examiner. A five-point Leikert-like scale (1=I know nothing about this subject, 5=I know everything there is to know about this subject) was used to gauge the student's attitude toward how much he/she knew about eight topics, three of which were topics of the three paragraphs which the student would read later, five of which were placebo topics. The 40 students averaged 2.85 on the five-point scale for the topic "zoo animals," 1.93 for the topic "lunar exploration," and 2.40 for the topic "trees." Their responses ranged from "I know very little about this subject" to "I know something about this subject."

Ss then read one of three expository passages of 163 words (Forms A, C, and D) selected at random from the *Ekwall Reading Inventory* (Ekwall, 1979). Readability level of the passages was determined to be eighth grade level, based on the

Harris-Jacobson Readability Formula (Harris and Sipay, 1980). Passages were composed by Ekwall, and normed on 40 students. Reliability of passages, based on administering forms within a period of one week, resulted in product moment correlation coefficients of .79 between Forms B and D, and .82 between Forms A and C. The topic of the paragraph labeled Form A is lunar exploration; this paragraph will be henceforth referred to as the *moon paragraph*. The topic of the paragraph labeled Form C is the ostrich, henceforth referred to as the *ostrich paragraph*. The topic of the paragraph labeled Form D is the rubber tree, henceforth referred to as the *rubber paragraph*.

Students were presented with one of the three paragraphs, and told to read the paragraph carefully; they were cautioned to remember as much of the paragraph as possible, since they would be asked to recite all they could remember from the paragraph into a cassette tape recorder later. Students were allowed as much time as they desired to read and to study the paragraph. They were then administered a serial learning task comprised of 12 neutral words presented in four trials with words exposed for two-second intervals; the task is one developed by Bloomer (1978) as part of a learning process test battery, and has been carefully normed and validated. Students attempted to memorize the words, and then wrote down the words they remembered for each of the four trials during a 20-minute interval.

Ss then recited all they remembered from the passage into a cassette recorder. Prompts were then provided in order to cue further recall. This procedure was repeated twice at one week intervals, until all paragraphs had been read.

Scoring

Protocols were scored twice, once for retention of exact wording, and then for retention of weighted wording. Specifically, a computer program was developed by USL computer programer Wayne Vicknair to match exact wording from an original or source paragraph with wording from a protocol (transcribed tape recording of a Ss' recitation of what he/she had remembered from a passage). For each word in the protocol which matches the original, a score of one is indicated, while a score of zero is indicated if the computer is unable to make that match. The program prints a list of one's and zero's for each word in the source paragraph, and totals the correct matches. A cumulative frequency distribution of matches for each word in the source paragraph is also printed.

Researchers in the area of discourse analysis suggest that recall should be weighted, that a Ss' recall of a determiner (*a, an,* or *the*) should not be weighted as heavily, because of the frequency of occurance due to the syntax of the English language, as verbs, subject nouns, direct objects, etc. which carry the brunt of the author's message. The Dolch 220, a list of basic sight words, comprises approximately 51% of text printed in English; due to their high frequency of appearance, they should probably not be weighted as heavily, since what characterizes the difference in meaning from one text to another is the content, which generally contains words of a more technical nature not contained in the Dolch list. The investigator, interested in weighting the protocols, simplistically decided to weight subject nouns and verbs as 6; auxillary verbs, 5; direct objects, indirect objects, predicate nominatives, and predicate adjectives, 4; infinitives, conjunctions, prepositions, objects of prepositions, 3; adjectives and adverbs, 2; determiners, 1. While recognizeably an over-simplistic method of handing weighting of exact wording, eventually hopes to develop a system for grading protocols which could be used by classroom teachers, who do not have the time necessary for the elaborate methods employed by researchers in discourse analysis for grading protocols. Vicknair's computer program provides a method of weighting individual words; the entire scoring cycle is then repeated, resulting in a score reflecting the examiner's weighting of words in the original paragraph matched with Ss' protocols.

Analyses

A packaged statistical program (*SPSS*, Nie, Hull, Jenkins, Steinbrenner, and Bent, 1970) was used to compute frequency distributions, descriptive statistics, Pearson product moment correlation coefficients, *t*-tests, and analyses of variance.

RESULTS

On the average, Ss retained 88.45 (54.25%) of the 163 words from the rubber paragraph, 71.96 (44.14%) of the words from the ostrich paragraph, and 73.27 words (44.95%) from the moon paragraph. The mean number of correct responses to the five comprehension questions was 4.14 (rubber paragraph), 4.42 (ostrich paragraph), and 4.13 (moon paragraph). Total scores on the three repetitions of the serial learning task (possible raw score=48) were 36.25, trial one; 36.50, trial two; and 36.75, trial three. Ss recalled, on the average, 6.34 of the 12 words presented in the first serial learning task one week after the initial presentation of the words, and 9.21 of the 12 words one week following the second presentation of the words. When the exact recall of wording from paragraphs was weighted as described earlier, Ss' mean scores were 294.29, rubber paragraph; 235.36, moon paragraph; and 253.43, ostrich paragraph.

Computed Pearson product moment correlation coefficients revealed low to moderate positive correlations between Ss' scores from the three serial learning tasks and the reading achievement scores from the SRA *Achievement Test, Level F* (see Table 1). Correlations computed between Ss' SRA scores and recall of paragraphs and weighted recall of paragraphs revealed mild, statistically non-significant positive correlations (see Table 2).

Correlations between Ss' self-assessed knowledge of topics associated with the main ideas of the paragraphs and their exact recall of wording were .42, .23, .02 with moon, rubber, and ostrich paragraphs, respectively. Little correlation was noted between self-assessed knowledge of the three topics by the 40 students (.27, ostrich; .07 rubber nnd .28, moon).

Ss' exact recall of wording from the three paragraphs was compared via *t*-tests, which revealed statistically significant differences between recall from the rubber paragraph (mean word recalled=86.72) and the moon paragraph (mean words recalled =74.21). No statistically significant differences on computed *t*-tests were noted between recall scores from the paragraphs on the moon and the ostrich, or between recall from the paragraphs on the ostrich and rubber. These results were replicated with weighted recall of the three passages. Correlation coefficients ranging between 0.54 and 0.65 were noted between the exact recall of wording from the three paragraphs and between 0.51 and 0.67 between weighted recall from the three passages (see Table 3).

Examination of correlation coefficients revealed low to moderate positive correlations between exact recall of the three paragraphs and the serial learning tasks, weighted recall of the three paragraphs and the serial learning task, and students' correct responses to the comprehension questions (prompts) and their scores on the serial learning task (see Table 4).

Table 1.

PEARSON PRODUCT MOMENT CORRELATION COEFFICIENTS BETWEEN SERIAL LEARNING AND SRA READING ACHIEVEMENT TEST SCORES (N=19)

	Serial Learning Task		
SRA Subtests	**Trial 1**	**Trial 2**	**Trial 3**
Vocabulary	0.27	0.03	0.45*
Comprehension	0.16	0.16	0.59**
Composite	0.24	0.09	0.55**

*p < .05
**p < .01

Table 2.

PEARSON PRODUCT MOMENT CORRELATION COEFFICIENTS BETWEEN SRA ACHIEVEMENT TEST SCORES IN READING AND EXACT RECALL OF PARAGRAPHS AND WEIGHTED RECALL OF PARAGRAPHS

	SRA Reading Subtests		
Exact Recall of	**Vocabulary**	**Compre-hension**	**Composite**
Moon Paragraph	0.28 (N=17)	0.38 (N=17)	0.29 (N=17)
Rubber Paragraph	0.11 (N=17)	0.36 (N=17)	0.24 (N=17)
Ostrich Paragraph	0.28 (N=8)	0.04 (N=8)	0.15 (N=8)
Weighted Recall of			
Rubber Paragraph	0.10 (N=17)	.039 (N=17)	0.24 (N=17)
Moon Paragraph	0.25 (N=17)	0.32 (N=17)	0.24 (N=17)
Ostrich Paragraph	0.24 (N=8)	0.02 (N=8)	0.18 (N=8)

Note: All of the above correlation coefficients are statistically significant at the .05 level.

Table 3.

PEARSON PRODUCT MOMENT CORRELATION COEFFICIENTS BETWEEN EXACT RECALL OF WORDING FROM THREE PARAGRAPHS AND WEIGHTED RECALL FROM THREE PARAGRAPHS

Exact Recall of Wording from:	Verbatim Recall of Paragraph Wording		
	Moon Paragraph	Rubber Paragraph	Ostrich Paragraph
Moon Paragraph		0.70** (N=29)	0.65** (N=18)
Rubber Paragraph			0.54** (N=19)
Weighted Recall of Wording from:			
Rubber Paragraph	0.67** (N=29)		
Moon Paragraph			0.61** (N=18)
Ostrich Paragraph		0.52** (N=19)	

* < .05
**P < .01

Table 4.

PEARSON PRODUCT MOMENT CORRELATION COEFFICIENTS BETWEEN Ss' EXACT RECALL, COMPREHENSION, AND WEIGHTED RECALL OF THREE PARAGRAPHS AND SCORES FROM CORRESPONDING SERIAL LEARNING TASKS

Raw Scores from Serial Learning Tasks Correlated with:	Pearson r	N of Ss	Level of Significance
Recall of moon paragraph	0.29	33	.05
Recall of rubber paragraph	.057	35	.01
Recall of ostrich paragraph	0.05	23	.42
Comprehension of moon paragraph	009	32	.32
Comprehension of rubber paragraph	0.43	35	.01
Comprehension of ostrich paragraph	0.27	24	.10
Weighted recall of moon paragraph	0.28	33	.06
Weighted recall of rubber paragraph	0.55	35	.01
Weighted recall of ostrich paragraph	0.04	23	.43

Two-way analyses of Ss' raw scores from the serial learning task (trials one, two and three) by sex by grade reveal statistically significant differences ($p < .05$) by grade level on trials one and two, with means higher for ninth grade students. No statistically significant differences were noted between sex and serial learning scores, or between grade level and serial learning scores from trial three.

Pearson product moment correlation coefficients between exact recall of paragraphs, weighted recall of paragraphs,a nd students' comprehension scores for the paragraphs are presented in Table 5. The correlation coefficients are positive, but low to moderate between students' exact recall and their comprehension of the questions, and show moderate to high statistically-significant relationships between comprehension scores and weighted recall.

One-way analyses of variance revealed no statistically significant differences between sex of Ss and Ss':

1) comprehension scores from the three paragraphs;
2) exact recall of wording from the three paragraphs;
3) weighted recall of wording from the three paragraphs;

However statistically significant differences exist between ninth and eleventh grade students:

1) comprehension scores from the three paragraphs;
2) exact recall of wording from the three paragraphs;
3) weighted recall of wording from the three paragraphs.

Grade level differences favored ninth grade students; their mean scores were higher in all of the above three analyses.

Table 5.

PEARSON PRODUCT MOMENT CORRELATION COEFFICIENTS BETWEEN Ss' RESPONSES TO RELATED COMPREHENSION QUESTIONS AND THEIR EXACT RECALL AND WEIGHTED RECALL OF THREE PARAGRAPHS

Related Comprehension Scores Correlated with:	Pearson r.	N of Ss	Level of Significance
Exact Recall of:			
Moon Paragraph	0.62	32	.01
Rubber Paragraph	0.32	35	.03
Ostrich Paragraph	0.28	23	.10
Weighted Recall of:			
Moon Paragraph	0.99	33	.01
Rubber Paragraph	0.99	35	.01
Ostrich Paragraph	0.98	23	.01

CONCLUSIONS

Secondary students retained between 44 and 54% of the exact wording from three eighth grade level paragraphs, a much higher percentage of retention than that reported by McKoon and Keenan (reported in Kintsch, 1974; McKoon, 1977), whose Ss recalled only 25% of the exact wording of passages read. Lovelace (1980), employing the same passages used in this study, noted that adults aged 20-39 retained a mean of 37.4 (25%) of the exact wording of the paragraphs. Statistically significant differences in recall of exact wording were based on the higher mean scores of ninth grade students who also scored significantly better than the eleventh grade students on two of the three serial learning task trials. Further investigations might help determine if older students and adults develop the ability to increase memory for the gist of a paragraph with a resulting decline in verbatim recall, or whether they develop a cautiousness factor, similar to that noted in adult cognitive studies, which makes them more reluctant to vocalize information if they are not absolutely certain that the information is appropriate.

While Ekwall reported a reliability coefficient of .79 between the rubber and moon paragraphs, statistically significant differences were noted in Ss' ability to recite exact wording from the passages (mean recall of wording from rubber paragraph= 88.43, mean recall of wording from moon paragraph=73.27). Significant differences were also noted in Ss' comprehension of the prompts provided after the free recall. Again, ninth grade Ss' mean scores appear to be the source of the difference.

This study suggests that the three paragraphs, equivalent in readabilty level according to the Harris-Jacobson formula, are not equivalent for ninth grade Ss, as far as verbatim recall of wording, weighted recall of wording, and comprehension scores are concerned. Pre- and post-testing using these equivalent pargraphs are is recommended as a means of determining these students' gains in reading achievement over a period of time.

Serial learning apparently is not a primary factor in reading achievement as measured by standardized reading tests, which may be due to the differing demands made on the reader by the two tasks. Standardized reading achievement tests generally allow the reader to search the passage for the correct answer to a multiple choice team, whereas recall of wording demands that the reader search long-term memory and discriminate among pieces of information in order to retrieve the correct information. Evidence from this study adds credence to the existence of differing demands placed on the reader by the two types of tasks.

Correlation coefficients between what students thought they knew about the paragraph topics and their actual recall are low, perhaps indicating an element of cautiousness on the part of the Ss, who may not have been willing to self-assess their knowledge, or who may have been unsure of just what particular concepts they were being asked to evaluate. A semantic differential technique will be employed in the replication of this study.

Weighted verbatim recall of passages correlated between .98 and .99 with Ss' comprehension of passages as measured by answers to comprehension questions (prompts), whereas exact recall correlated with comprehension resulted in coefficients of .28 to .62. Weighting of exact recall of wording appears to be a more accurate means of measuring students' understanding of prose.

REFERENCE NOTES

Mathews, II, S. R. & Campbell, K. Comprehension research: Beyond single dependent measures. Paper presented at the American Reading Conference, Sarasota, Florida, 1980.

Lovelace, T. Adult Recall as a Measure of Comprehension. Paper presented at the American Reading Conference, Sarasota, Florida, 1980.

REFERENCES

Anderson, J. R. & Paulson, R. Representation and retention of verbatium information. *Journal of Verbal Learning and Verbal Behavior*, 1977, *16*, 439-452.

Bloomer, R. *Learning Test.* New York: Brador, 1979.

Durrell, D. D. *Durrell Analysis of Reading Difficulty.* New York: Harcourt, Brace, Jovanovitch, 1955.

Ekwall, E. E. *Ekwall Reading Inventory.* Boston: Allyn and Bacon, Inc., 1979.

Farr, R., & Roser, N. *Teaching a child to read.* New York: Harcourt, Brace, Jovanovitch, Inc., 1979.

Gagne, E. D. Long term retention of information following learning from prose. *Review of Educational Research*, 1978, *48*, 629-665.

Harris, A. J., & Sipay, E. R. *How to increase reading ability, 7th Ed.* New York: David McKay Co., Inc., 1980.

Kintsch, W. On modeling comprehension. *Educational Psychologist,* 1979, *14,* 3-14.

Kirsh, I., & Gutherie, J. T. The concept and measurement of functional literacy. *Reading Research Quarterly,* 1977-1978, *13,* 485-507.

Klatzky, R. L. *Human Memory: Structures and Processes, 2nd Ed.* San Francisco: W. H. Freeman and Company, 1980.

McKoon, G. Organization of information in text memory, *Journal of Verbal Learning and Verbal Behavior,* 1977, 16, 247-260.

SECONDARY STUDENTS' KNOWLEDGE OF TEXTBOOK METASTRUCTURE

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The concept of textbook metastructure has no direct research precedent in educational literature. There exist, however, several lines of inquiry which led to the present study. Research on metalinguistics has investigated learners' knowledge of the technical, linguistic vocabulary used to talk about language (Downing, 1972; Mattingly, 1972). Adopting this line of thought, metastructure has been defined as the technical, linguistic vocabulary used to talk about textbooks (Mateja & Wood, 1981).

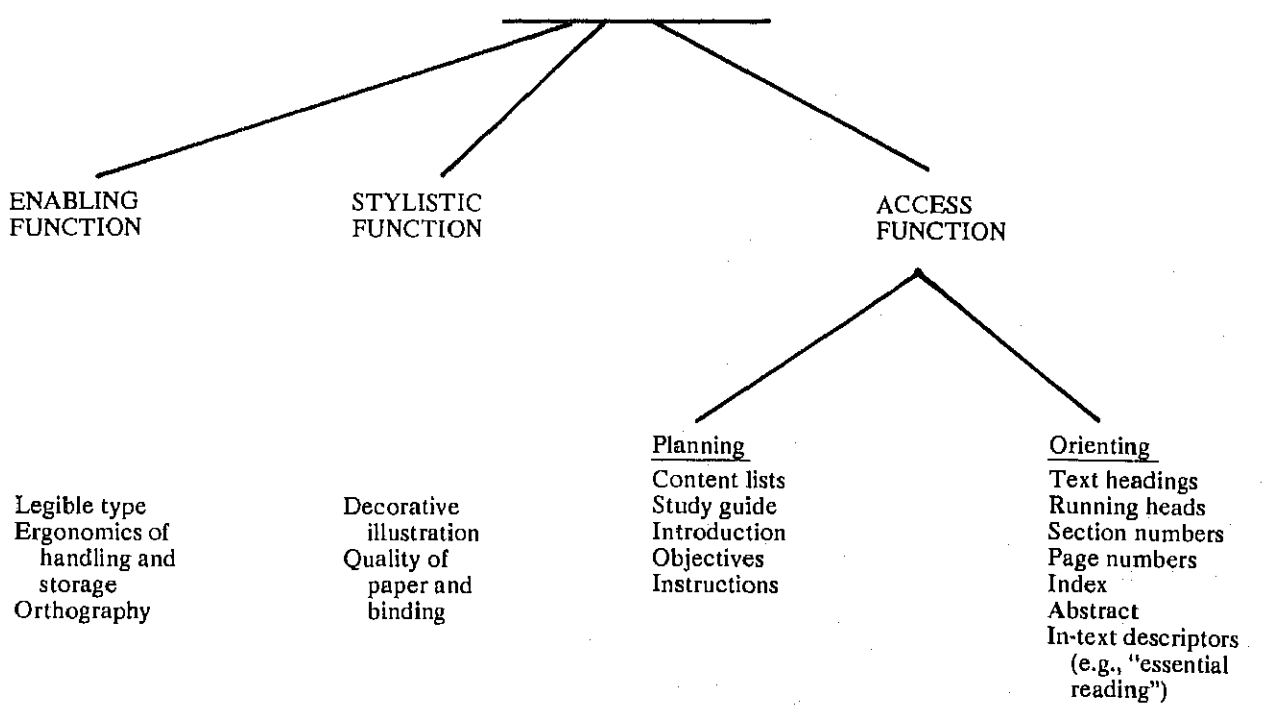
Vernon's findings (1957) that reading problems were strongly associated with cognitive confusion and a lack of system were expanded by Downing (1979) into the Cognitive Clarity-Cognitive Confusion Theory. The major premise of the Cognitive Clarity-Cognitive Confusion Theory is that learners experience various degrees of cognitive understanding and cognitive bewilderment as they pass through stages of knowledge. In essence, learners are seen as simultaneously manifesting clarity and confusion—clarity with respect to those skills and knowledge which have been mastered, and confusion with respect to those skills and knowledge which need to be learned. In order to understand the nature of reading, therefore learners need to acquire two necessary abilities regarding its: 1) purposes and 2) technical characteristics (Vernon, 1971).

Applied to textbooks, the logical place to investigate learners' abilities would be in their presentation functions. For example, Waller (1977a) identified three types of presentation functions: 1) enabling, 2) stylistic and 3) access. Access structures were further divided into two types—those which helped readers plan their strategies and those which helped readers execute their strategies. (See Figure 1) Waller's structural arrangement contains many of the complex, conceptual units relating to content area textbooks. Macdonald-Ross (1978) reasoned that access structures provided parallel guidance from typography (microtypography, macrotypography) as provided by text meaning units (micropropositions, macropropositions) (Kintsch & van Dijk, 1978; Kintsch & Vipond, 1979). Whalley (1980) posited that readers could avail themselves selectively of both the linguistic and extralinguistic cueing systems in order to learn efficiently from discourse. Such signals may provide information to readers for relevance assignment (van Dijk, 1979), especially if they are made explicit in the text processor system via numbering, emboldening or footnoting (Whalley, 1980).

Research on the effects of textbook layout and organization has confirmed much of the intuitive thinking on typographic

Figure 1

Text Presentation Functions



cueing systems. Results suggest that various visual organizational patterns influence learners' comprehension (Hartley & Burnhill, 1977; Wendt, 1979; Holley *et al.*, 1981). Additionally, more complete graphic aids under conditions of forced study improve learners' recall (Dean & Kulhavy, 1981; Schwartz & Kulhavy, 1981). These studies point toward learners' developing feature-location skills for remembering graphic-discourse arrangements because neither reading achievement nor academic success guarantees facility with study skills (Hawkins, 1977; Johnson & Crano, 1978).

The idea of replacing all the letters and numbers on the printed pages with *x*s or *X*s has been suggested by some learning experiments. *X*s have been employed in studies of pattern recognition for concept formation (Garner, 1974; Royer & Garner, 1966, 1970) and of spacing conditions for meaning stimulus span during eye fixations (McConkie & Rayner, 1975). They have also been used in demonstrations of teaching the concept of textbook organization (Binkley & Gerhard, 1980) and of notation systems for graphic variables (Twyman, 1981). Mateja and Wood (1981) have termed such a modification to textbook layouts "content-deleted text" because it maintained the concept of overall surface structure (i.e., visual, spatial and syntactic) while it eliminated the discourse's deep structure (i.e., propositional and semantic). Research with normal text consistently has found that younger and poorer readers have attended to the surface structure to the detriment ofmeanings (Canney & Winograd, 1979; Garner, 1980), although little difference has been found between groups on their use of syntactic and semantic cues to make corrections until the materials increased in difficulty (D'Angelo, 1981).

Purpose

The purpose of this study was to assess secondary students' knowledge of the technical, linguistic vocabulary used to refer to the access structures of textbooks as well as the relationships between and among particular access structures, graphics and text. Students were assessed with a content-deleted text so that interactions with information in the text would be minimized, but also, so that differences in reading achievement and text readability would be somewhat controlled.

METHOD

Subjects

A total of 156 students, 67 seventh- and 89 twelfth-graders were selected as subjects. Subjects were tested in hetergeneous, intact content area classrooms during normal class periods. The classroom teachers (1 @ 7th, 1 @ 12th) provided a reading ability rating for each student. The study was conducted near the end of the academic year to enable teachers to identify students' reading levels with greater confidence and accuracy, and also to ensure that twelfth-graders would have reached their maximum public school potential before graduation and that seventh-graders would have had almost a year's experience in a departmentalized setting.

Materials

The stimulus materials consisted of a two-page, content-deleted excerpt from a middle-school, science textbook (Heimler & Lockard, 1977). The content was deleted by replacing all letters and numbers with *x*s or *X*s of equal point size and weight. This was done to minimize the interaction between readers and the content in the text, but also, the highlight the textbook's access structures. Graphics were masked enough to reduce content, yet allow for locational identification as place holders.

Assessment instrument

A 20-item, multiple-choice assessment instrument was developed to measure subjects' knowledge of access structures and the language used to refer to them in the content-deleted text. Specifically, test items measured subjects': a) recognition of particular access structures and b) understanding the relationships between or among access structures, graphics and text. Conbach's Alpha Indices (test-retest) revealed a reliability coefficient of .78 for the instrument.

Procedure

Subjects were given a 10-minute training session with a normal and a content-deleted personal letter as well as sample questions. Afterwards, subjects were allowed five minutes to study the two-page, content-deleted excerpt. Finally subjects were issued the assessment instrument and were instructed to use the content-deleted text to answer the questions. Subjects were allowed to work at their own rate, and all subjects completed the assessment instrument by the end of the period.

Results

Subjects' protocols were analyzed in terms of gender membership (male, female), age-for-grade in the sample (average and above average, below average), grade level (7th, 12th) and reading ability rating (above average, average, below average).

Table 1

MEANS AND STANDARD DEVIATIONS FOR TWO AGE GROUPS

Age	n	$\bar{X}$	sd
Below average	48	11.48	3.68
Avernge or Above average	108	10.55	4.35
(BA + A,AA)	N = 156		

Table 2

MEANS AND STANDARD DEVIATIONS FOR TWO GENDERS

Gender	n	$\bar{X}$	sd
Male	85	11.22	4.20
Female	71	10.37	4.12
(M + F)	N = 156		

Table 3

MEANS AND STANDARD DEVIATIONS FOR TWO GRADE LEVELS

Grade Level	n	$\bar{X}$	sd
Seventh (7th)	67	9.42	3.71
Twelfth (12th)	89	11.90	4.19
(7th + 12th)	N = 156		

Table 4

MEANS AND STANDARD DEVIATIONS FOR THREE READING ABILITY LEVELS

Reading Level	n	$\bar{X}$	sd
Above Average (AA)	74	12.70	3.97
Average (A)	44	10.68	3.55
Below Average (BA)	38	7.37	2.77
(AA + A + BA)	N = 156		

Data were analyzed using a 2 × 2 × 2 × 3 factorial (age × gender × grade level × reading level) ANOVA with an unbalanced design. Results for the four variables are reported in Tables I-IV.

There were not statistically significant interactions between or among gender, age, grade level and reading level. No statistically significant differences were found for gender [$F(1,133)=.18$; $p < .67$] or age [$F(1,133)=0.01$; $p < .98$]. Statistically significant main effects were found for both grade level [$F(1,133)=24.98$; $p < .0001$], and reading level [$F(2,133)=28.97$; $p < .0001$] with reading level accounting for a greater proportion of the variance. A series of Scheffe *post hoc* multiple comparison tests revealed that the above average readers scored statistically significantly higher than both the average and below average readers. Average readers, meanwhile, scored statistically significantly higher than below average readers. Finally, twelfth-graders' scores on the criterion measure were statistically significantly higher than seventh-graders' scores. Tests of importance (Cohen, 1965) revealed that reading level and grade level accounted for approximately 42% of the variance in scores on the criterion measure.

Discussion

In terms of extending the Cognitive Clarity-Cognitive Confusion Theory to middle and high school students' knowledge of textbook metastructure, the data support the notion that readers continue to experience differential states of clarity and confusion. Above average readers generally appeared to be in a state of cognitive clarity across grade levels. However, below average readers generally appeared to be in a state of cognitive confusion in spite of grade level. Average readers generally appeared to experience varying degrees of clarity and confusion, with twelfth-graders enjoying greater clarity and seventh-graders encountering greater confusion. On the whole, twelfth-graders were characterized by greater clarity and seventh-graders by greater confusion. Both boys and girls and students at different ages within grades generally appeared to experience similar states of clarity of confusion.

Whereas the data lend general support to the Cognitive Clarity-Cognitive Confusion Theory, the phenomena seem to be a more function of achievement than development, at least for knowledge of textbooks' access structures. The results support the importance of facility with print over the chronological development for the ability to use textbook metastructure. From this perspective, it appears that above average readers have gained understanding of the technical concepts needed for talking and thinking about the tasks involved in acquiring the skillful use of textbook metastructure (Vernon, 1971; Fitts & Posner, 1967). These results would appear to support the value of world knowledge and prior experiences (Vernon, 1970) for perceptual-cognitive flexibility and behavior (Thurstone, 1944).

The results also support other research on metacognition, metalinguistics and metacomprehension (Brown, 1978, 1980; D'Angelo, 1981) which finds that better and older readers not only prove more facile when engaging in problemsolving with print, but also that they possess greater awareness of their understanding or misunderstanding as they work through problems. It would appear that above average and older readers are able to spontaneously generate coping strategies which are both complex and varied enough to solve tasks which require simultaneous processing of visual, configural and relational stimulii. In this respect, above average and older readers can be associated with greater flexibility in their search, location and utilization of alternative solutions when presented with print-related problemsolving tasks. Above average readers, in particular, seem to have mastered the two phases of knowledge as identified by Vygotsky (1962) in that they possess both an automatic unconscious acquisition of knowledge and an active conscious control over their learning.

Implications

If knowledge and experience represent the distinguishing factors between clarity and confusion in regard to the technical, linguistic vocabulary used in conjunction with textbooks, then the most obvious educational implication is training, with an especially heavy emphasis on vocabulary (Davis, 1941). Research on instruction in visual spatialization tasks supports the notion of students' amenability to learning (Goodson, 1981; Johnson & Crano, 1978; Kerst & Howard, 1978). Similar results are reported for training students to utilize text structure and organizational patterns (Meyer, 1975; Meyer, Brandt & Bluth, 1980; Meyer & Freedle, 1979).

Using Waller's taxonomy of access structures (1977a,b) for micro- and macro-typography, teachers can help students to become aware of and utilize such cueing systems. Direct teacher intervention might take the form of a six-step, full-processing model in which the teacher 1) models his/her behaviors on a sample textbook, 2) provides an initial teacher-and-students practice session with more modeling, 3) provides a second teacher-and-students practice session for students to share their strategies with each other, 4) provides a third practice session for students to use their own and others' strategies, 5) provides students with a practice session in which they work alone and then check their work and 6) plans for systematic followup on a regular basis. On all occasions the teacher needs to supply knowledge of results to students as well as employ a variety of materials for a variety of purposes.

Whatever learning strategy is employed in teaching textbook metastructure, it appears that students' self-awareness, self-knowledge and self-monitoring can be raised by emphasizing problemsolving, troubleshooting and bookhandling skills. To be effective, every strategy might benefit from including: 1) each student's basic learning techniques, 2) the rules regulating textbook layout, 3) the many, different uses and purposes of textbooks, 4) direct experiences with a variety of textbooks under kaleidoscopic conditions and 5) the importance of bringing to bear world knowledge and prior experience in learning from textbooks.

REFERENCES

Binkley, M. & Gerhard, C. Relationships found in reading and teachable through the arts. Paper presented at the Twenty-fourth Annual College Reading Association Conference, Baltimore, Maryland, 1980.

Brown, A. L. Knowing when, where, and how to remember: A problem of metacognition. In R. Glaser (Ed.), *Advances in instructional psychology*. Hillsdale, N.J., Lawrence Erlbaum Associates, 1978.

Brown, A. L. Metacognitive development and reading. In R. J. Spiro, B. C. Bruce, and W. F. Brewer (Eds.), *Theoretical issues in reading comprehension*. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1980.

Canney, G., & Winograd, P. *Schemata for reading and reading comprehension performance.* (Tech. Rep. No. 120). Urbana, Ill: Center for the Study of Reading, University of Illinois at Urbana-Champaign, 1979.

Cohen, J. Some statistical issues in psychological research. In B. B. Wolman (Ed.), *Handbook of clinical psychology.* New York: McGraw-Hill Book Co., 1965.

D'Angelo, K. Correction behavior of good and poor readers. *Reading World,* 1981, *21,* 123-129.

Davis, F. B. *Fundamental factors of comprehension in reading.* Unpublished doctoral dissertation, Harvard University, 1941.

Dean, R. S., & Kulhavy, R. W. Influence of spatial organization in prose learning. *Journal of Educational Psychology,* 1981, *73,* 57-64.

Downing, J. Children's developing concepts of spoken and written language. *Journal of Reading Behavior,* 1972, *4,* 1-19.

Downing, J. *Reading and reasoning.* New York: Springer-Verlag, 1979.

Fitts, P. M., & Posner, M. I. *Human performance.* Belmont, Calif.: Brooks/Cole Publishing Co., 1967.

Garner, R. Monitoring of understanding: An investigation of good and poor readers' awareness of induced miscomprehension of text. *Journal of Reading Behavior,* 1980, *12,* 55-64.

Garner, W. R. *The processing of information and structure.* Potomac, Maryland: Lawrence Erlbaum Associates, 1974.

Goodson, F. E. The plasticity of the perceptual process. *Bulletin of the Psychonomic Society,* 1981, *19,* 26-27.

Hartley, J, & Burnhill, P. Understanding instructional text: Typography, layout and design. In J. A. Howe (Ed.), *Adult learning: Psychological research and application.* London: J. A. Wiley & Sons, 1977.

Hawkins, J. A., Jr. How should reading and study skills tests scores correlate? *Journal of Reading,* 1977, *20,* 570-572.

Heimler, C. H., & Lockard, J. D. *Focus on life science.* Columbus, Ohio: Charles E. Merrill Publishing Co., 1977.

Holley, C. D., Dansereau, D. F., Evans, S. H., Collings, K. W., Brooks, L., & Larson, D. Utilizing intact and embedded headings as processing aids with nonnarmtive text. *Contemporary Educational Psychology,* 1981, *6,* 227-236.

Johnson, C. D., & Crano, W. D. Effects of spatial skills training on reading performance. *Journal of Experimental Education,* 1978, *46,* 25-28.

Kerst, S. M., & Howard, J. H., Jr. Memory psychophysics for visual area and length. *Memory and Cognition,* 1978, *6,* 327-335.

Kintsch, W., & van Dijk, T. A. Toward a model of text comprehension and production. *Psychological Review,* 1978, *85,* 363-394.

Kintsch, W., & Vipond, D. Reading comprehension and readability in educational practice and psychological theory. In L. G. Nilsson (Ed.), *Perspectives on memory research.* Hillsdale, N.J.: Erlbaum & Assoc., 1979.

Macdonald-Ross, M. Language in texts: The design of curricular materials. In L. S. Shulman (Ed.), *Review of research in education.* Itasca, Illinois: F. E. Peacock Publishers, Inc., 1978.

Mateja, J. A., & Wood, K. D. Middle and high school students' awareness of textbook metastructure. Paper presented at the Twenty-fifth Annual College Reading Association Conference, Louisville, Kentucky, 1981.

Mattingly, I. G. Reading, the linguistic process, and linguistic awareness. In J. F. Kavanaugh & I. G. Mattingly (Eds.), *Language by ear and by eye.* Cambridge, Mass: MIT Press, 1972.

McConkie, G. W., & Rayner, K. The span of the effective stimulus during a fixation in reading. *Perception and Psychophysics,* 1975, *17,* 578-586.

Meyer, B. J. F. Identification of the structure of prose and its implications for the study of reading and memory. *Journal of Reading Behavior,* 1975, *7,* 7-47.

Meyer, B. J. F., Brandt, D. M., & Bluth, G. J. Use of top-level structure in text: Key for reading comprehension of ninth-grade students. *Reading Research Quarterly,* 1980, *16,* 72-103.

Meyer, B. J. F., & Freedle, R. *The effects of different discourse types on recall.* Princeton, N.J.: Educational Testing Service, 1979.

Royer, F. L., & Garner, W. R. Perceptual organization of nine-element auditory temporal patterns. *Perception and Psychophysics,* 1970, *7,* 115-120.

Royer, F. L., & Garner, W. R. Response uncertainty and perceptual difficulty of auditory temporal patterns. *Perception and Psychophysics,* 1966, *1,* 41-47.

Schwartz, N. H., & Kulhavy, R. W. Map features and the recall of discourse. *Contemporary Educational Psychology,* 1981, *6,* 151-158.

Thurstone, L. L. A factorial study of perception. *Psychometric Monographs,* No. 4, 1944.

Twyman, M. Typography without words. *Visible Language,* 1981, *15,* 5-12.

van Dijk, T. A. Relevance assignment in discourse comprehension. *Discourse Processes,* 1979, *2,* 113-126.

Vernon, M. D. *Backwardness in reading.* London: Cambridge University Press, 1957.

Vernon, M. D. *Perception through experience.* New York: Barnes & Noble, Inc., 1970.

Vernon, M. D. *Reading and its difficulties.* London: Cambridge University Press, 1971.

Vygotsky, L. S. *Thought and language.* Cambridge, Mass.: MIT Press, 1962.

Waller, R. H. *Three functions of text presentation.* Milton-Keynes, U.K.: Institute of Educational Technology, The Open University, 1977(a).

Waller, R. H. *Typographic access structures for educational texts.* Milton-Keynes, U.K.: Institute of Educational Technology, The Open University, 1977(b).

Waller, R. H. How does typography aid comprehension? Paper presented at the Annual Meeting of the American Educational Research Association, Boston, Mass., 1980.

Wendt, D. An experimental approach to the improvement of the typographic designs of textbooks. *Visible Language.* 1979, *13,* 108-133.

Whalley, P. A partial index of text complexity involving the lexical analysis of rhetorical connectives. Paper presented at the Sixth International ALLC Symposium, London, England, 1980.

REACTION: SECONDARY STUDENTS' KNOWLEDGE OF TEXTBOOK METASTRUCTURE

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Mateja and Wood have used a logical procedure to determine secondary students' knowledge of the metastructure of a content text. Interestingly, skill in using this metastructure to better understand content information is an ability which content teachers assume that students possess. However, as found in this study, this ability varies from grade to grade and is affected by the student's reading level.

Reading specialists acknowledge the importance of textbook format and typographical aids in enhancing the comprehension of content materials. Although the skill has been accepted as an important one for some time, little instruction has occurred in the elementary or secondary schools to further develop the skill. The procedure used by Mateja and Wood to assess students' use of textbook metastructure is an excellent way for content teachers to assist in the teaching of this necessary skill for content reading. Using their system of xs with pages from the content text, teachers may demonstrate how textbook metastructure provides clues which aid comprehension. Following this demonstration, the students may work in groups using the actual text material and the metastructure to survey the content of the material and develop questions which may be used as guides for reading. Awareness of textbook metastructure will assist students as they survey materials prior to reading.

If students were aware of the textbook metastructure, their ability to identify organizational patterns of text materials would be enhanced. Because content textbooks follow definite organizational patterns (Cheek and Cheek, in preparation) and because students' ability to recognize organizational patterns seems to be beneficial in improving comprehension of text materials (Meyer, Brandt, and Bluth, 1980), this study has specific implications for reading instruction at the secondary level. These include:

(1) Understanding of textbook metastructure may be a skill which secondary teachers can assist their average and below average readers in developing in order to help them better comprehend their content materials.
(2) Developing an understanding of textbook metastructure should help students in recognizing tbe pattern of organization in the text. This in turn should assist in determining which comprehension skills are to be applied to best understand the material.
(3) Helping content teachers become aware of the textbook metastructure will provide them with a basis for understanding how to help students learn to read content materials.

While research as to the importance of textbook metastructure is only beginning and the relationship of this metastructure to organizational patterns is based more on logic than on research, it appears that these areas are extremely important to improving the reading of secondary content materials. Of course, secondary students who have developed the ability to apply many of the comprehension skills to their content materials use textbook metastructure and the organizational patterns of the text narrative to further their understanding. But the average and below-average readers need more "crutches" to help them comprehend content text material. Perhaps these are the missing links which content teachers need to teach in order for content learning to be an achieveable goal for a larger percentage of our secondary students. Textbook metastructure seems to be the logical first step to improving comprehension of content materials!!

REFERENCES

Cheek, Martha Collins and Cheek, Earl H. "Organizational Patterns: Untapped Resources for Better Reading." In preparation.

Meyer, Bonnie, J. F.; Brandt, David M.,; and Bluth, George J. "Use of Top-Level Structure in Text: Key for Reading Comprehension of Ninth-Grade Students." *Reading Research Quarterly* 16 (1980): 72-103.

CRITICAL READING, REASONING, AND CONSUMER DECISION MAKING

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Recent national and international events have brought to public attention the finiteness of resources in the economic, political, and social environments. Almost daily the media brings news about double-digit inflation, fluctuating interest rates, higher gasoline prices, unemployment, budget cuts, etc. In this technological environment the consumer-citizen is required to make complex economic decisions affecting not only the individual but the family and larger national and international communities as well. Both individual and social costs and benefits need to be evaluated before each consumer financial decision is made. Thus, consumer decision making is an inherent part of daily living.

Consumers are influenced by the market environment which transmits information in the forms of print and non-print media. Such information may often present conflicting perspectives regarding the benefits and costs of a purchase, investment, etc., to the consumer. Where print is the primary source of consumer information, the abilities to read, analyze, and judge the validity of information presented are necessarily important. Subsequent consumer decisions made on the basis of this information need to be well thought out.

Impulsive consumer decisions may have negative financial consequences for individual consumers. Further, since consumer decisions do have an impact on the socio-economic environment, the ability of citizens to use reading and decision making skills has implications for society. Teachers at all grade levels need to recognize the importance of instruction in reading and decision making skills for consumer education. That is, consumer education should not be left to chance.

Previous research, however, has indicated that adults and children lack some of the skills needed to make consumer decisions and are not capable of solving fundamental consumer problems encountered in daily life. None of the studies reviewed investigated the potential problems children and adults might have in formulating decisions. Specifically, little or no attention has been given to the processes used in reaching a final consumer decision. Instead, most of the studies have focused on subjects' knowledge of consumer economics and application of that knowledge.

Harris and Associates (1970) attempted to assess people's ability to complete government and business forms. A sample of 1,685 individuals 16 years and older representing the civilian non-institutionalized population of the continental United States participated in the study. The findings of the study revealed that three percent of the sample or an estimated 4.3 million persons fell into the lowest literacy category. Two percent of the sample or an estimated 7.1 million individuals fell into the category termed "questionable survival."

A second study by Harris (1971) also used government and business application forms as test material to measure literacy levels. Portions ofthe test were taken from authentic forms often used by many Americans. Additional questions based on classified advertisements and telephone dialing instructions were included in the 57 item survey test. Procedures for sample selection were the same as in the earlier Harris (1970) study. Results of the survey revealed that an estimated 15 million adults would have great difficulty completing the required forms in real life situations.

The forms used by Harris in both studies reflect demands placed on consumers in daily life. And reading skills used in completing a variety of forms are a prerequisite for successful independent consumer activities. Although both of Harris' studies were commendable efforts in identifying illiteracy levels, it was beyond the scope of his studies to focus on consumer skills above the knowledge level.

The Adult Performance Level Project (APL), established in 1971, was concerned with assessing knowledge and skills competencies of the continental U.S. adult population aged 18 to 65 years old (University of Texas—Austin, 1977). Among the skills areas assessed were reading, writing, speaking, and listening (communication). Consumer economics comprised one of the general knowledge areas. Three literacy levels were determined on the basis of income, education, and occupational status. These literacy levels ranked from lowest to highest were labeled APL 1, APL 2, and APL 3. The resulting raw scores from the assessment instrument were defined in terms of the same three APL levels.

Predictions about the performance levels of the adult population with respect to the knowledge and skills areas were then made. Of special significance to the present discussion were the findings related to reading and consumer economics. Specifically, the results of the test measuring knowledge of consumer economics indicated that 29.4 percent of the population fell into the APL 1 category, approximately one-third (33.0 percent) of the population were APL 2's, and 37.6 percent were APL 3's. There were fewer subjects who were classified as APL 3's in consumer economics than in other knowledge areas assessed. These findings suggest that consumer economics is one knowledge area which proved difficult for subjects, perhaps because of limited educational opportunities provided in consumer economics.

A closer examination of some of the test items (University of Texas—Austin, 1977) reveals that success on those items depends upon the ability of the respondent to use reading skills. For example, one item required that respondents observe a notice describing a check cashing policy and draw a correct conclusion related to that policy. The APL levels for reading indicate that 21.7 perent of the population were operating at level one, while 32.2 and 46.1 percent were operating at levels two and three respectively.

The dta from the APL study reveal that reading skills and consumer education are needed and should receive additional attention in the schools. For the most part, the consumer economics objectives used for the APL project are at the knowledge and comprehension levels as defined by Bloom (1956). The final report did not list reading objectives although this skill area was assessed.

The National Assessment for Educational Progress and the Food and Drug Administration (NAEPFDA, 1979) collaborated on a pilot study in 1977 to ascertain whether or not the average American adult can read and understand labels on foods, drugs, and medical devices. More than 1,200 adults aged 26 to 35 years of age participated in the study. Findings from the investigation suggest that the higher the educational level of the respondent, the more likely s/he is to comprehend the information on the label and to deduce information not included on the label which could be of critical concern to health and safety. For example, one item required interpretation of a drug interaction precaution written on the label. This study is important since authentic examples of labels were used to test consumer and reading skills necessary for survival.

A second study conducted by the National Assessment for Educational Progress (NAEP, 1979) assessed the consumer skills of 17 year-olds in the following areas: 1) Economics, 2) Consumer Protection, 3) Energy, 4) Finance, 5) Consumer Behavior (advertising, decision making, and shopping), 6) Contracts, 7) Purchasing, and 8) Mathematics. An examination of test items used in the teenage consumers study shows that many of the items require prior knowledge of the consumer education areas as defined by NAEP. For example, in economics the following question appeared: "Of the taxes the federal government collects which tax provides the most revenue?" (NAEP, 1979, p. 7). A few items were hypothetical situations which required students to draw conclusions concerning consumer behavior. Other items required respondents to make a consumer decision in light of given situations, but none of the representative items published in the NAEP 1979 document assessed aspects of the processes involved in making consumer decisions. Nor did the items present examples from real warranties, contracts, advertisements, etc., and have subjects ascertain the most valid sources of information and make decisions in light of possible consequences. Once again, the items appear to assess prior factual knowledge instead of the decision making process related to consumer economics. Reading skills, which should be incorporated into this decision making process, are ignored for the most part.

According to Schoenfeld (NAEP, 1979, p. 53) ". . . in my view the objectives of consumer education should be to develop hesitancy on the part of the individual before s/he takes any action or makes any decision. This would be followed by a thought process wherein the options and the consequences of those options are considered before determining a course of action." Apparently some tests of consumer education do not consider the processing of information through reading, nor do they assess the decision making processes. Yet both reading and decision making processes are inherent in formulating wise consumer decisions.

Like the NAEP, APL, and other studies of consumer education, the schools, too, have tended to focus on knowledge acquisition rather than on developing critical thinking and decision making skills. (Indiana Project for Consumer and Economic Education Guidelines, ND, p. 6). Early efforts related to consumer education in schools were usually relegated to junior and senior secondary students (sometimes the non-academic student) and fragmented between courses in the social sciences, home economics, and business education. Such instruction usually ignored a practical application for consumers in the marketplace. (Indiana Project for Consumer and Economic Education Guidelines, ND, p. 1)

Although numerous definitions of consumer education exist, for purposes of this paper consumer education has been defined as follows:

> Consumer education is multidisciplinary and draws on concepts from economics, social science, business, mathematics, and home economics. Consumer education is the study of the knowledge, skills, and understandings needed by individuals and groups to manage effectively consumer resources and to take actions as citizens related to daily and ongoing consumer decision making. Reading is recognized as a needed skill in consumer decision making. Consumers must consider the value, content, and validity of information sources—some of which appear in print—in order to achieve maximum satisfaction through the responsible use of available resources.

The consumer must gather information from both print, e.g., purchase agreements, consumer reports, and non-print sources, engage in some comparative analysis of the information, synthesize the results of both information gathering and analysis, and then make a decision from among the vast array of consumer goods and services.

An adapted form of Wentworth's (1976) comments related to economic literacy and efficacy provide insight into the prerequisite reading and reasoning skills needed to make effective consumer decisions. A literate consumer:

(1) can use/read economic terminology (vocabulary).
(2) can recognize the personal/family costs and benefits of making a particular purchase.
(3) will consider opportunity cost when deciding on a purchase.
(4) can distinguish between conclusions reached on the basis of empirical evidence found through reading various consumer related materials versus conclusions reached on the basis of desire, rumor, or other preconceptions.
(5) can draw conclusions after reading about the projected purchase and make choices consistent with those of wise consumers.
(6) can use logical reasoning to develop a conclusion.
(7) has the reading skills appropriate for reading contracts, purchase agreements, warranties, etc.
(8) recognizes that any judgment made on the basis of limited information is potentially inadequate and realizes that judgment may be subject to possible revision if new information becomes available.

Effective use of these skills underscore the importance of reading and reasoning skills development in order to make effective consumer decisions from among several possible alternative decisions.

Consumers must also recognize that economic relationships are intertwined with political, social, cultural, and technological changes. These changes modify the goods consumed and mode of exchange between consumers and producers. In fact, the growing interest in consumer education is itself a product of change in the economy and society. The need for ongoing consumer education and growth of consumer awareness have generated "Consumer Reports" and "Wise Buying" columns in newspapers and magazines.

Understanding basic economic concepts and principles is central to effective consumer decision making. Consumers need knowledge of the economic system and its functioning. Consumer education needs to include the study of the consumer's role as an individual and as a member of society in a variety of settings. Today consumer education is to help students gain ". . . competence in the knowledge and skills needed to make decisions and take actions as informed and responsible consumers in a broad range of consumer behavior modes" (Bannister & Monsma, 1980 p. 11).

The authors have developed a "Consumer Decision Action System Model" which suggests a complex relationship between the individual and related external and internal factors. The model considers socio-economic and information areas which influence the context in which decisions are made. Social and individual goals and values are also factors which determine consumer actions and decisions. The model also shows that the decision making process and the decision product/outcome are predicated on reading and reasoning skills.

A discursive account of the system must begin with the external and internal environments as shown in the model. The external environment is composed of two sub-systems, the socio-economic and the information sub-systems. The socio-economic sub-system includes the economic, political, social, ecological, and technological systems or influences which operate on the individual (Bannister & Monsma, 1980). The information sub-system includes print and non-print media, oral and sign language, and experience with the world. While these areas often co-occur, they have been isolated in the model for the purpose of illustration. The information sub-system, as shown in the model, provides the mode of access to the socio-economic sub-system. For example, in the main, the political system is not immediately experienced by groups or individuals; rather knowledge of and involvement with the political arena are mediated by print and non-print informational sources.

Personal factors are main components of the internal environment. These factors include an individual's resources, place in the life cycle, prior knowledge, and affect. Resources refer to physical, emotional, financial, and cognitive aspects of a person. Prior knowledge is that information which is assimilated by the individual and is fit into pre-existing schemata. The intended meaning of affect is exemplified in the taxonomy created by Krathwohl, Bloom, and Masia (1964). All of these personal factors are given expression in the form of needs and wants and lifestyle preferences of the individual. The internal and external environments are related through processes of socialization, individuation, interaction, and tension. With respect to socialization and becoming an individual Habermas (1979, p. 109), McCarthy (1978, pp. 335-7), and others have suggested that the socio-economic sub-system presents various roles which are transmitted to the child largely through the family. The information sources aid in reinforcing those roles.

The internal environment effects socialization in that people are not simply role takers but are active creators of the roles they play. Personal factors, as shown in the model, influence people as they create their roles. Thus, people are socialized through a variety of means yet these processes operate in such a way as to make each of us an individual.

Simultaneously, the multiplicity of individuals operating within and through groups will change, maintain, and effect the socio-economic and information sub-systems. Changes in personal factors, when they occur at the same time in a large number of individuals, will have an effect on the external environment. As the model shows, the interaction between external and internal environments is mutually operative. Interaction, then, refers to the continual dynamic of exchange between internal and external environments. And interaction is such that priority can be given to neither external nor internal environments. Each acts continually on the other.

Tension exists between the external and internal environments. The external environment exerts pressure on the individual to conform. This pressure can come from the peer group, from advertising, or any number of other sources. Such pressure to conform can be experienced as a lack, in which case the individual comes to desire the object or circumstances presented by the external environment, or it may be experienced as an unwelcome intrusion, as a demand to be resisted. In either case, the relation between internal and external environments is characterized by tension.

The context for consumer behaviors indicated in the model are the consumer decision action areas (Bannister and Monsma, 1980, p. 10). These consumer decision action areas include resource management and citizen participation. The consumer decision action areas may be "pushed" or constrained through both the external and internal environments. The goals and values generated from the internal and external environments act as mediators on the consumer decision action areas.

Decision making, as implied in the model, involves formulating rational choices regarding an event, action, object, or idea of some importance to the consumer. These reasoned choices reflect the values of the decision maker and are based on the acquisition of adequate and correct data as well as on existing alternatives (Cassidy & Kurfman, 1977, p. 1). Although the printed word is usually the primary means of transmitting consumer information (Williams, 1976, p. 22), decisions are often made on the basis of impulse, peer pressure, from habit, or by default.

Decision making processes have been examined by scholars in several disciplines and from different perspectives. In general, most scholars would agree that decision making involves seeking answers to three fundamental questions: (1) What is the problem to be solved? (2) What alternatives are available? and (3) Which alternative is best at this time? or What are the consequences of this choice?

The response to question one requires identifying the issues to be decided and clarifying the goals to be achieved when the final decision is made. In order to answer question two, the decision maker needs to identify the alternatives available. At this point the consumer may be drawing on prior knowledge, gathering additional printed information, and comparing analogous situations. The effective use of the gathered data encourages both practice and creative consideration from among several possibilities. The greater knowledge available to the decision maker, the greater the possibility of alternatives. Limited knowledge implies fewer alternatives available to be used in the decision making process.

The final phase of the process examines and evaluates possible alternatives which are compared for short and long term gains and consequences. Here the values of the decision maker are emphasized and conflicting multiple values, priorities, and competing goals are reconciled. A commitment to take appropriate action is implied as is a willingness to assume responsibility for those consequences and actions. At this point the consumer selects the most appropriate alternative. This is the consumer decision/action.

Drucker (1967) suggests a particular decision is not viable unless the decision can be implemented. After implementation of a decision, the decision maker should analyze, review, and evaluate the decision and, if necessary, re-enter the decision making process at the appropriate place. This evaluation is an important aspect of decision making since future decisions may be influenced by previous decisions. While the decision making process is time consuming, the returns on the time investment result in more efficient and effective decisions.

Resnick (1976, p. 79) has suggested a model of problem solving which bears some similarity to the decision making model proposed in this paper. The Resnick problem solving model has three interacting phases. During the first phase the problem is identified. In the second phase the "task environment" is scanned for cues to appropriate responses. The third phase consists of "... goal analysis in which goals are successively reformulated partly on the basis of external task cues, in order to yield soluble sub-goals that contribute eventually to solution of the task presented" (Resnick, 1979, p. 79). Both the decision making model in this paper and Resnick's problem solving model indicate that the problem must be formulated, the alternatives must be recognized, and goals or alternatives must be

created prior to reaching the solution or decision.

As Cassidy and Kurfman (1977, p. 7) note the decision making process is not usually linear but takes into account "... subjectivity, intuition, individuality, and ... values." Needed skills are interrelated and used in various ways throughout the decision making process. Five overarching skills categories important for consumer decision making have been identified.[1] These skills, not necessarily unique to consumer education, can be taught in reading, social science, and other curriculum areas. The skill categories are given below.

1. FACILITATING SKILLS provide the foundation framework for basic skill development in consumer decision making. Observing, classifying, sequencing, defining terms, and recognizing spatial relations are fundamental skills. Reading, for example, cannot take place unless the student has developed these prerequisite skills.
2. CONCEPTUALIZING SKILLS require the formation of a mental image of a concrete object, type of behavior, or abstract idea. A concept described by a word or phrase conjures an image which can be used to provide insights into the organization of data. Conceptualizing involves collecting, grouping, and labeling information.
3. PROCESSING SKILLS include weighing information, comparing and contrasting, formulating questions and hypotheses, inferring, predicting outcomes, testing hypotheses, and gathering and compiling information from various sources.
4. OPERATING SKILLS require interpretation of graphs, charts, etc., valuing and judging, searching for cues in the environment, communicating, and social interaction.
5. REASONING SKILLS presuppose development in the preceding skills categories. Reasoning is the attempt to reach a conclusion about some event, action, object, or idea. Effective use of reasoning depends upon the ability to form deductive, inductive, and analogical arguments.

[1]Definitions have been adapted from the following sources: Carpenter: 1963; Goldmark: 1968; Simon: 1970; Fair & Shaftel: 1967; Taba: 1971; Hartoonian: 1979; and Michaelis, *et. al:* 1968.

Reading skills which should be applied during the decision making process will vary according to the nature of the text material available and according to the reader's ability. The skills required in a given consumer situation, the reader's abilities, and the interaction between them can be productively approached through the theory of metacognitive activities described in Otto, White, and Camperell (1980, pp. 60-73). Metacognition is the explicit and/or tacit awareness one has of one's cognitive activities and the application of those processes to achieving understanding, problem solving, etc. The decision making process as described in the present model demonstrates an instance in which metacognitive activity should occur.

There are three specific aspects of metacognitive activity which have implications for consumer decision making and reading. The first aspect of concern is the reader/decision maker's knowledge of the type and depth of cognitive processing which is appropriate for reading particular types of consumer documents. A second type of metacognitive activity includes the *task variables* which involve the reader/decision maker's ability to assess the relative difficulty of a consumer related document or decision. The amount of reading required for the informed comparison of two commodities or the nature of the related text material could cause problems if improperly assessed by the reader/decision maker. *Strategy variables,* a third type of metacognitive activity, are those processes an individual should use to solve a consumer problem. For example, absence of knowledge about which strategy to apply during consumer decision making can lead to unwise and perhaps impulsive consumer actions. In addition, the reading strategies which should be used during the decision making process must be determined and judiciously applied by the consumer.

Brown (1977, as cited in Otto *et. al.* 1980, pp. 63-64) has specified several examples of reading behaviors which she believes involve metacognitive decisions. These behaviors, when adapted for the purpose of consumer decision making, are as follows:

a. Clarifying the purpose for reading in light of the consumer problem. As Brown suggests, the reader must understand the stated and unstated requirements of the task. For example, the wise reader/decision maker must recognize that comparisons of commodities should be made and later alternatives must be evaluated in terms of their consequences.
b. Recognizing the important aspects of the consumer problem and of the supporting reading material.
c. Focusing attention and concentrating on the salient aspects of the consumer problem and accompanying reading material.
d. Assessing or monitoring ongoing activities as they occur so as to ensure success. For instance, as the reader/decision maker proceeds through the decision making process, s/he must recognize the requirements of each step of the process as that step occurs. The reader, too, must recognize whether s/he has succeeded in comprehending as s/he reads the necessary purchase agreement, etc.
e. Using self-questioning, inherent in the decision making procedure, to determine whether or not each part of the process is in fact being met. Self-questioning and review, retrospective activities, are also necessary after reading consumer related documents to ensure that all relevant data have been gathered prior to weighing alternatives.
f. Making adjustments when the consumer fails to complete any part of the decision making process. The reader must also switch reading strategies if comprehension failure is detected during or after reading consumer related documents.

The authors are suggesting that teachers make these metacognitive skills, which are important for reading and consumer decision making, explicit through the use of consumer dilemmas. These dilemmas have instructional value in that students are taught *how* to make consumer decisions through the use of reading consumer content materials. Simutaneously, the students will utilize self-monitoring strategies in the processes of consumer decision making and reading as they solve consumer dilemmas.

The dilemmas are short stories written at the grade and interest levels of a particular audience. In each dilemma the protagonist is confronted with a problem consumers typically encounter. An authentic consumer document (e.g., a charge account and security agreement) and possibly readings from a respected consumer magazine accompany each dilemma. Prior to reading students give a confidence rating to reading material indicating the ease or difficulty of the printed material for them. Question sheets designed to encourage students to reread specific parts of the written material are included with each dilemma and consumer document. Finally, students proceed through the steps of the decision making process. During the process, students create and complete their own decision making matrix composed of the alternatives, and the gains and consequences of each alternative. Students state the decision they have reached on the basis of available data and then evaluate their decision.

Wise consumer decision making is vital both for the quality of the decision maker's life and for the potential effects consumer decisions have on society. In this paper the authors have proposed a model which clarifies the decision making process and the factors which influence the process. Effective use of reading and reasoning skills inherent in consumer decision making presumes that such skills have been identified in the curriculum and taught in school. Consumer dilemmas when used in various content areas provide an excellent vehicle for teaching these basic life skills.

The metacognitive activity involved in reading consumer related documents and in decison making can be supported, taught, and made explicit through the use of consumer dilemmas. In addition, specific vocabulary, comprehension, and consumer decision making skills can be taught through this type of learning activity. Students engaged in these and similar instructional activities should learn to become skilled readers and competent consumer decision makers.

REFERENCES

Bannister, R. & Monsma, C. *Classification of concepts in consumer education* prepared for the U.S. Office of Consumers' Education Contract #300780552). Washington, D.C.: National Consumers League, April 1980.

Bloom, B. S. (Ed.) *Taxonomy of educational objectives the classification of educational goals, handbook I: cognitive domain,* New York: Longman, Inc., 1956.

Brown, A. L. *Knowing when, where, and how to remember: A problem of metacognition,* (Technical Report No. 47). Urbana, Illinois: Center for the Study of Reading, University of Illinois, June 1977.

Carpenter, H. M. (Ed.) *Skill Development in social studies.* 33rd Yearbook, Washington, D.C.: National Council for the Social Studies, 1963.

Cassidy, E. W. & Kurfman, D. G. Decision making as purpose and process. In D. G. Kurfman, (ed.), *Developing decision making skills,* 47th yearbook, Arlington, Virginia: National Council for the Social Studies, 1977.

Drucker, P. *The effective executive,* New York: Harper & Row, 1967.

Fair, J. & Shaftel, F. R. (Eds.) *Effective thinking in the social studies,* 37th yearbook. Washington, D.C.: National Council for the Social Studies, 1967.

Goldmark, B. *Social studies—a method of inquiry.* Belmont, CA: Wadsworth, 1968.

Habermas, J. *Communication and the evolution of society* (T. McCarthy, trans.). Boston: Beacon Press, 1979 (originally published, 1976).

Harris, Louis & Associates *Survival literacy: conducted for the national reading council.* New York: Louis Harris & Associates, 1970.

Harris, Louis & Associates *The 1971 national reading difficulty index: A study of reading ability for the national reading center.* New York: Louis Harris & Associates, 1971.

Hartoonian, H. M. Reasoning as a metaphor for skill development in the social studies curriculum. *Theory and research in social education,* 1979.

Indiana project for consumer and economic education guidelines. N.D.

Krathwohl, D. R., Bloom, B. S. & Masia, B. B. *Taxonomy of educational objectives, the classification of educational goals, handbook II: affective domain.* New York: David McKay Company, Inc., 1964.

McCarthy, T. *The critical theory of Jurgen Habermas,* Cambridge: The MIT Press, 1978.

Michaelis, J. et. al. *Social sciences education framework for California public schools kindergarten and grades one trough twelve* (proposed). Sacramento, Californin: Department of Education, 1968.

NAEP FDA: do adults really know what all those labels mean? *NAEP Newsletter,* June 1979, pp. 2, 5, 6.

NAEP *Teenage consumers: a profile* (report No. 09-CN-01). Denver: National Assessment for Educational Progress, June 1979.

Otto, W., White, S., & Camperell, K. *Text comprehension research to classroom application: A Progress Report* (Theoretical Paper No. 87). Madison, WI: Wisconsin Research and Development Center for Individualized Schooling, The University of Wisconsin, October 1980.

Resnick, L. B. Task analysis in instructional design: some cases from mathematics. In D. Klahr (Ed.), *Cognition and instruction.* New York: John Wiley & Sons, 1976.

Simon, F. *A reconstructive approach to problem-solving in the social studies—a handbook for inquiry and post-inquiry activity in social process,* Calgary, Alberta (Canada), 1970.

Taba, H., Durkin, M. C., Fraenkel, J. R., & McNaughton, A. H. *A teacher's handbook to elementary social studies—an inductive approach* (2nd ed.). Reading, Massachusetts: Addison-Wesley, 1971.

University of Texas—Austin. *The adult performance level study: final report,* Austin, Texas: University of Texas, Austin, 1977. (ERIC Document Reproduction Service No. ED 185113).

Wentworth, D. R. *Economic literacy and efficacy: suggestions for research,* Washington, D.C.: National Council for the Social Studies, 1976. (ERIC Document Reproduction Service No. ED 013371).

Williams, A. *Reading and the Consumer,* London: Hodder & Stoughton in association with the United Kingdom Reading Association, 1976.

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MULTI-DISCIPLINE ANALYSIS OF SUBVOCALIZATION EFFECTS ON COMPREHENSION

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Subvocalization is an activity which cuts across disciplines. It occurs while students read in science, social studies, and English materials. It is pervasive, yet not understood. Furthermore, it is a language behavior which has been a subject of controversy in the discipline of reading for many years. Some educators' views reflect Huey's thinking (1908):

> There can be little doubt that the main meaning comes to consciousness only with the beginning of the sentence utterance, and the reader does not feel he has the complete sense until he has spoken it. He is almost sure to deliberately say the passage over to himself if it is difficult and persons who do not read very much must usually use an actual whisper, even in easy reading, if the meaning is to be obtained. (p. 147)

The opposite viewpoint, that subvocalism is detrimental to the reading process, can be traced to proponents of the silent reading method which emanated from the discovery that silent reading was faster than oral reading (Buswell 1945).

Currently, most authorities agree that subvocalism does occur among readers of all ages. In addition, it is widely regarded as a negative phenomenon (Bond and Tinker 1973, Ekwall 1970, Spache 1976, Smith 1978) in spite of a growing body of evidence to the contrary.

In a recent search of the literature, covering the years from 1966-1981, relating subvocalization to reading and language comprehension, there were approximately one hundred fifty studies reported. Generally, these studies can be broadly classified into the following four areas: 1) subvocalism and its incidence in early childhood language behavior, 2) the relationship of subvocalism to rate of reading, 3) the effect of feedback and suppression of subvocalism on related language behaviors, and 4) verbal mediation and its impact on cognitive behaviors.

While the literature search clearly indicates that there has been a great deal of research conducted on subvocalism during reading and other related language behaviors, there has been no definitive attempt to summarize and synthesize the research in this area. The purpose of this paper is to examine a select group of reports which were prominent in the four areas mentioned in order to: 1) identify the current state of knowledge about subvocalism, 2) clearly delineate what implications there are for teaching in developmental programs, remedial programs, and in content reading, and 3) suggest what future directions research in this area should take.

CURRENT STATE OF KNOWLEDGE

Subvocalism and Language Development

There have been a number of investigations which have reported on the incidence of subvocalization among young children performing different language tasks. Amodeo (1975) investigated one aspect of developmental progress in language acquisition, "private speech" (a form of subvocalization), especially as it relates to monolingual and bilingual children. All the children exhibited private speech. There were differences in the quantity of subvocalization and the differences indicated that bilingual children exhibit less private speech than monolingual children. Dickie (1973), in an earlier study which focused on private speech reported that 1) more private and social speech occurred when peers were in the room than when parents

were there, and 2) more private speech occurred during free play than during a structured task.

Garrity (1973) investigated the relationship of subvocalization to recall on short term memory tasks. She found that 1) subvocalization and short term memory were significantly correlated, 2) the correlation between subvocalization and short term memory was higher for boys than for girls, and 3) finally, subjects who subvocalized most had significantly higher recall scores than subjects who subvocalized the least. In a subsequent study (1975) involving the levels of subvocalization as related to picture presentation and verbal tasks she found that the amount of subvocalization is significantly related to the amount of recall. She also found that younger, slower children subvocalized less than older, brighter children. Furthermore, Garrity (1977) while conducting research on subvocalization and short term memory, noted that preschoolers as young as age four engaged in spontaneous subvocalization.

Ringwald (1978) conducted an investigation which focused on the role of subvocalization in short term memory as it relates to beginning reading instruction. She found that the high correlation between memory tests, reading test scores, and subvocalization is a significant predictor of reading ability at the beginning stage. She reported also that the combination of mental age and subvocalization was a significant predictor of reading at the beginning stage. Uchida-Nobuko (1955), while working with a group of five year olds, found that both internal (subvocalization) and external verbalization facilitated learning and sentence comprehension. Locke and Fehr's investigation (1970) of speech code and recall among four and five year olds led them to conclude that the nature of an individual's short term memory is shaped to some extend by the phonetic characteristics of the implicit response to the material. They suggested that a critical function of the speech code is that of mediating the environment.

Subvocalism and Rate of Reading

A major thrust of subvocalization research over the years has centered on gathering empirical data on the effect of techniques designed to reduce or eliminate subvocalization. Researchers who considered subvocalization detrimental to the reading process because it was viewed as a deterrent to rate of reading used delayed auditory feedback (DAF) and biofeedback training to decrease subvocalism. A major issue that appears to have been overlooked by the critics of subvocal activity is the differences in the various levels of the activity itself as identified by Edfeldt (1960):

1) Saying or loud whispering of almost every word.
2) Faint whispering of many words.
3) Pronounced lip movements but no sound.
4) Faint or no lip movements, no sound, but sufficient movements of the tongue to be felt by the fingers under the lower jaw.
5) No sound, no movements of lips or tongue, but movements in the throat perceptible to the fingers if placed on the throat.
6) No sound, no movements of lips or tongue or in the throat directly perceptible to an observer, but movements which can be registered by means of electromyography.

Oviously, the first two levels which actually involve production of speech would limit rate of reading to an oral reading rate. The next two levels involve lip movement, but no sound could presumably occur at a somewhat faster rate. The last two levels involve little motor activity. Therefore, it seems reasonable to assume that rate would be faster.

Verification of this theory appears to have been provided from research by Laffey (1966) which showed that rate of subvocalization increased parallel to rate of presentation by machine until a saturation point was reached. In addition, Feldman's research (1974) showed that rate of subvocalization increased as rate of silent reading increased. In fact, silent readers produced the most speech muscle activity. This nullifies Smith's contention (1978), which, incidentally, was not supported by empirical data, that silent reading is too fast for subvocalization to occur. Riley and Lowe (1981) also concluded that subvocalization is not related to rate of reading after unsuccessfully attempting to reduce or eliminate it through biofeedback training.

It would appear that both the rate of reading and the rate of subvocalization adjust according to the difficulty of the material, decreasing as the material becomes more difficult to understand and increasing as less difficult material is read. In other words, difficulty of the material is the apparent determinant of rate of reading as well as rate of subvocalization.

Suppression and Feeback

An important aspect of the suppression research, which is critical in terms of understanding the role of subvocalization in reading and language comprehension, deals with its effect on short term memory. The researchers who used delayed auditory feedback or had subjects count aloud during reading have reported that either 1) the suppression of vocalization did not have a detrimental effect on comprehension (Bergering 1975, Colle 1973, Ferrara 1977) or 2) that the suppression of subvocalization did in fact interfere with comprehension (Donovan 1977, McGuigan 1973, Cole and Young 1975, and Wells 1976).

While the argument can be made that having subjects count aloud while reading would cause direct interference in comprehending the printed message, other research which contends with a related issue, that of determining what happens when subvocalization is permitted to occur naturally without any attempt to suppress it in any manner, clearly suggests that it aids in short term memory and reading comprehension. McGuigan (1974) indicated that subvocalization facilitated the reading proficiency of college students. Izzo (1975) found that an increase of subvocalization in his subjects increased comprehension. Keeny et. al. (1967) utilized verbal rehearsal training with six and seven year olds which resulted in improved recall scores.

Verbal Mediation—The Integrative Factor

While subvocalism has frequently been considered as a kind of undesirable behavior which either inhibits effective reading or has a serious detrimental effect on such cognitive behaviors as reading comprehension, some writers view subvocalization as an essential mediation strategy which connects print and language. According to Laffey (1966), one indication of the significance of oral reading to successful silent reading is the role that vocalism or covert language plays in the silent reading process. It is well known among reading educators that when a person encounters difficult material and wants to understand that material, he/she will often read the material so that some voice mechanisms ean be heard or observed by others viewing the person reading silently. In any attempt to retain information, an individual, at whatever level of reading, will often read the material both silently and orally, so that the material is processed consciously and overtly through the language center of the brain, in both the auditory and visual channels. Furthermore, it is not only a matter of retention when considering vocalism during silent reading, but also a matter of basic understanding. When a person wants to be sure that he is understanding an idea or concept, he will attempt to process the language through both channels again, thus, enabling him to understand the concept as he is reading silently.

Aarons (1971) conducted an experiment with a group of

mature readers who were classified as high or low subvocalizers and concluded that theoretically subvocalization "may amplify meaning in the externally directed thinking of reading." Hardyck and Petrinovich (1970) concluded that subvocal speech is a useful stimulus to mediate cognitive responses. Levy (1975) while investigating the question as to whether phonemic or auditory processing is beneficial during reading worked with over 150 high school and college students in three experiments and found that 1) speech-motor activity during reading plays a useful information-processing role, 2) suppressing subvocalization by asking students to count while reading dramatically depresses retention, and 3) that the auditory channel was superior to the visual channel in processing information. This author viewed these findings as indicating that the suppression procedure is one in which the speech activity usually associated with the comprehension process is prevented from operating naturally as it does when a reader subvocalizes while reading silently. Essentially, then, subvocalization as viewed and described in these studies is the mediational bridge that connects printed symbols to the cognitive processing of language. This view, of course, is different from that of the psycholinguists who contend that reading is a matter of going from print to meaning without any mediational step.

Tarver et al (1977) provides further enlightenment on the role of subvocalization as a mediational strategy. These researchers conducted an experiment which supported the hypothesis that selective attention deficits in children with learning disabilities, as well as inadequate verbal rehearsal strategies, as compared to the strategies employed by typical children, represent a developmental lag rather than a more permanent defect in learning and/or information processing. This is consistent with Hagen's (1975) viewpoint that selective attention develops with age and is particularly relevant to the notion that verbal mediation strategies facilitate the development of short term memory (Belmont and Bntterfield 1971, Bristow 1976, Ellis 1970) and selective attention (Hagen and Kail 1970). Furthermore, since these two aspects of information processing are thought to be basic psychological processes upon which all higher levels of cognitive processing are dependent, there is a resultant developmental delay of higher levels of cognitive functioning among learning disabled children. It is important to note that subvocalization is viewed as a key verbal rehearsal strategy reported in this study. Flavell et al (1966), who also viewed spontaneous verbal rehearsal in memory tasks as a function of age, suggested that verbal rehearsal requires certain intellectual competencies and a demonstration of sustained attention. He noted a continued increase in verbalization from 2nd to 5th grade.

According to McGuigan and Winstead (1970), the phonetic code facilitates semantic processing and subvocalization aids efficient processing by serving as the mechanism for retaining information from long term memory. This is particularly enlightening when considered with Perfetti and Goldman's contention (1976) that short term memory capacity is not as important as the efficiency with which it's used. Subvocalism would appear then to develop the capacity of short term memory, as indicated in research discussed earlier, and promote efficiency of its use as well, by facilitating the retrieval process.

Oral reading, the overt form of subvocalization, serves as verbal mediation with reading disabled students. The use of oral reading techniques on a regular basis resulted in statistically significant gain scores in a number of studies (Laffey, Kelly, Perry 1980, Laffey and Kelly 1981, Negin and Rios 1980, Title I Report 1981—in preparation). Perhaps the effectiveness of this verbal mediation strategy can be explained when one considers Farnham-Diggory and Gregg's (1975) research which showed that poor readers have an asynchrony between the auditory and visual channels. Obviously, verbal mediation would tend to have a synchronizing effect. The researchers concluded that the attentional control mechanisms for the reading process were vested in the auditory channel.

Lassen (1978), while investigating brain blood flow activity during silent and oral reading, observed that "it is now apparent that during a (neurological) test involving a specific type of function (i.e., speaking, thinking, listening) there is a local change in nerve-cell activity and hence in metabolic rate that gives rise to an increase in blood flow in the aetive (brain) region." Furthermore, he states later in his paper "the resting pattern of blood flow in the brain of a normal subject is highly characreristic and reproducible and it serves as a point of departure for the interpretation of the functional patterns recorded during different types of sensory, motor, and purely mental activity. With this information as the logical and empirical bases of his investigations he noted that reading silently and reading aloud involved different blood flow patterns of activity in the cortex. Reading silently activated four cerebral cortex areas: 1) visual association area 2) the frontal eye field 3) the supplementary motor area and 4) Broca's speech center in the lower part of the frontal lobe. Reading aloud, on the other hand, activates these four regions plus three more centers: 5) the mouth area 6) the auditory cortex and 7) the primary visual cortex. What appears to be exceptionally significant about this neurological data is that subvocalization has been noted as a technique that inividuals use to provide auditory feedback as a rehearsal strategy. Also important to note is the reality of Broca's speech center functioning during silent reading. This pheomena would seem to lay to rest the notion that it is possible, while reading, to go from print to meaning. Since Broca's speech center is functioning during silent reading, this clearly suggests that reading is a matter of going from print to oral language (speech) to meaning. Further arguments to support this point of view come from the work of Aarons (1971) who notes that speech is a complex skill with auditory and kinesthetic components. In reading vision, speech and its auditory, kinesthetic and sensory motor components coordinte intermodally and intramodally all of these complex elements. It seems reasonable then to suggest that subvocalization is an unconscious and sometimes conscious technique readers use to not only integrate these complex elements but also use it as a verbal rehearsal strategy. This latter activity appears to fit within Osgood's mediational hypothesis which describes the visual, auditory, and motor sensory integration as a basis for verbal learning or "mediating reaction" which seems to be a psychological construct that can be used to describe subvocalization. A final bit of evidence that offers enlightenment on both the neurological processes and their integration during reading has been offered by Brown (1979)(. He noted the existence of neurological activity in the speech center of the brain during CAT scans of the brain during silent reading when no recordable subvocalization was taking place. Again, this seems to highlight a continuum of activity during the process of relating print to oral language to meaning.

CONCLUSIONS AND IMPLICATIONS FOR TEACHING

The authors of this paper have synthesized the results of a wide variety of investigations of subvocalization as it relates to

langunge behaviors. The importance of the synthesization lies in the patterns suggested by the results of the investigations, the tentative conclusions which can be drawn based on those patterns, and the implications of the conclusions for instructional programs:

1) Subvocalization is a natural speech related adjunct to reading which is part of the process of internalizing the phonetic code. The internalization of the code provides for automatic processing of phoneme/grapheme correspondences, thus, freeing attention for comprehension.

2) When the reading task requires some type of recall activity, subvocalism should be encouraged as a type of verbal rehearsal, particularly with remedial students.

3) Efforts to suppress subvocalism should be discontinued especially among disabled readers since research clearly indicates that it enhances comprehension.

4) In content classrooms, greater emphasis should be placed on encouraging students to vocalize or verbalize the technical language of the subject matter. Content teachers need to be informed of the role of subvocalization in the reading process as indicated by the wide body of research reviewed for this paper.

RESEARCH DIRECTIONS

An analysis of the recurrent patterns of results in the investigations suggests that future research in a number of areas would lend further clarity to the role of subvocalization in the reading process:

1) Student populations with various types of deficits should be investigated including those who have demonstrated: (a) developmental lag, (b) asynchronous modalities, and those that give (c) evidence of a lack of internalization of the code.

2) Investigations of brain function during reading should be an area of emphasis in subvocalization research, particularly with the following procedures: (a) blood flow monitoring and (b) CAT scanning.

3) Longitudinal research focusing on different strategies for helping students to internalize the code, particularly those which include subvocalization as an overt method, should be conducted. At least these three techniques should be used: (a) verbal rehearsal strategies, (b) listen and read techniques, (c) repeated readings.

4) Research that deals with clarifying how phonemic encoding acts as the bridge between short-term memory and long-term memory is especially needed.

REFERENCES

Amodeo, H. B. The Functional Significance of Private Speech During Problem Solving in Monolingual and Bilingual Two to Five Year Old Preschoolers. Dissertation Abstracts International, 1977, p. 2657-A.

Aarons, H. "Subvocalization: Aural and EMG Feedback in Reading," *Perceptual and Motor Skills*, Vol. 33, 1971, pp. 271-306.

Belmont, J. M. and Butterfield, E. C. What the Development of Short-Term Memory Is. *Human Development*, 1971, 14, pp. 236-248.

Bergering, A. J. An Investigation of Laryngeal EMG Activity and its Relation to Reading. Dissertation Abstracts International, 1976, Feb., Vol. 36, (8-B), p. 4192.

Bond, G. H. and Tinker, M. A. *Reading Difficulties: Their Diagnosis and Correction*, (3rd ed.), New York: Prentice-Hall, 1973.

Bristow, P. S. The Relationship of Reading Ability, Freedom From Distractibility, Verbal Knowledge and Ability, and Sex to Amount of Subvocalization in Reading, Doctoral Dissertation, University of Georgia, 1978.

Brown, E. R. A Theory of Reading. New York University, 1978.

Brown, E. R. The Relevance of Neurological Factors in the Reading kProcess, paper presented at 1979 National Reading Conferences, San Antonio, Texas.

Buswell, G. T. Non-Oral Reading—A Study of its Use in the Chicago Public Schools. *Supplementary Educational Monographs*. No. 60, 1945.

Cole, R. A. and Young, M. "Effect of Subvocalization on Memory for Speech Sounds," Journal for Experimental Psychology: Human Hearing and Memory, 1975, Nov., Vol. 104 (1), (6), pp. 772-779.

Colle, H. A. Rehearsal in Inner Speech Resources In Education, E.R.I.C. Document 70521, Apr., 1973, Chicago University, Illinois.

Dickie, J. R. Private Speech: The Effect of Presence of Others, Task and Intrapersonal Variables. Dissertation Abstracts International, 1973, Sept., Vol. 34 (3-B), p. 1292.

Donovan, K. M. Comprehension and Subvocalization in Normal and Speed Readers. Dissertation Abstracts International, 1979, May, Vol. 39, 11B, p. 5609.

Edfeldt, A. As quoted in *Silent Speech and Reading*, Chicago: University of Chicago Press, 1960, pp. 77-78.

Ekwall, E. E. *Locating and Correcting Reading Difficulties*, (Vol. 2), Columbus: Charles E. Merrill Pub. Co., 1977.

Ellis, N. R. "Memory Processes in Retardates and Normals," in N. R. Ellis (ed.), *International Review of Research in Mental Retardation*, (Vol. 4), New York Academic Press, 1970.

Farnham-Diggory, S. and Gregg, L. W. "Short-Term Memory Function in Young Readers." *Journal of Experimental Child Psychology*, Vol. 19 (1975), pp. 279-298.

Feldman, J. M. Little Voices Inside: The Influence of Articulation on Oral and Silent Reading Rate, Doctoral Dissertation, University of Michigan, 1975.

Ferrara, P. The Relationship of Subvocal Speech Activity to Encoding Processes and Recall in Short-Term Memory, Dissertation Abstracts International, Vol. 38, No. 5-B, 1977, p. 2396.

Flavell, J. H., Beach, D. R., and Chinsky, J. M., "Spontaneous Verbal Rehearsal in a Memory Task as a Function of Age." *Child Development*, 1966, Vol. 37, pp. 283-299.

Garrity, L. I. The Role of Subvocal Speech in Memory: An EMG Study of Pre-School Children, Doctoral Dissertation, University of Houston, 1973, pp. 1-175.

Garrity, L. I. "An Electromyographical Study of Subvocal Speech and Recall in Pre-School Children." *Developmental Psychology*, May, 1975, Vol. 11, No. 3, pp. 274-281.

Hagen, J. W. "Some Thoughts on How Children Learn to Remember." *Human Development*, 1971, Vol. 14, pp. 262-271.

Hagen, J. W. and Kail, R. V. The Role of Attention in Perceptual and Cognitive Development. In W. M. Cruickshank and D. P. Hallahan (Eds.) *Perceptual and Learning Disabilities in Children*, Vol. 2., Syracuse: Syracuse University Press, 1975.

Hardyck, C. C. and Petrinovich, L. F. "Subvocal Speech and Comprehension Level as a Functon of the Difficulty Level of Reading Material," *Journal of Verbal Learning and Verbal Behavior*, 1970, Vol. 9, pp. 647-652.

Huey, E. B. *The Psychology and Pedagogy of Reading*. New York: The Macmillan Co., 1908.

Izzo, R. A. Reading Comprehension in Fourth Grade Children as a Function of Biofeedback Training to Increase Subvocalization. Doctoral Dissertation, University of Pennsylvania, 1975. Dissertation Abstracts International, 1976, 36, 6357 B.

Keeney, T. J., and Flavell, J. H. "Spontaneous and Induced Verbal Rehearsal in a Recall Task," *Child Development*, 1967, Vol. 38, pp. 953-966.

Laffey, J. L. The Effect of Different Modes of Presentation of Reading Materials on Vocalism in Silent Reading, Doctoral Dissertation, University of Pittsburgh, 1967, pp. 1-100.

Laffey, J. L., Kelly, D., and Perry, B. "The Effect of Repeated Reading of Taped Literature on Reading Achievement." *Perspective in Reading and Reading Instruction*. (Edited by Michael L. Kamil and Alden Moe) Twenty-Ninth Yearbook of the National Reading Conference, San Antonio, Texas: The National Reading Conference, 1980, pp. 189-193.

Laffey, J. L. and Kelly, D. "Repeated Reading of Taped Literature: Does It Make a Difference?" *Comprehension: Process and Product*, First Yearbook of the American Reading Forum (George McNinch, ed.), University of University of Southern Mississippi Press, Hattiesburg, Mississippi, 1981, pp. 80-83.

Lassen, W. A., Ingvar, D. H. and Shinhj, E. "Brain Function and Blood Flow." *Scientific American*, (September, 1978), pp. 62-71.

Levy, B. A. "Vocalization and Suppression Effects in Sentence Memory," *Journal of Verbal Learning and Verbal Behavior*, Vol. 14, 1975, pp. 304-316.

Locke, J. H. and Fehr, F. S. Young Children's Use of the Speech Code in Learning, *Journal of Experimental Psychology*, 1970, Vol. 10, pp. 701-733.

McGuigan, F. J. Silent Speech During Silent Reading, ERIC Document 003312 U.S. Office of Education, 1964.

McGuigan, F. J. and Winstead, C. H., Jr. "Discrimination Relationship Between Covert Oral Behavior and the Phonemic System In Internal Information Processing." *Journal of Experimental Psychology,* 1974, Vol. 103, No. 5., pp. 885-890.

Negin, G. A. and Rios, J. H. "Read It With Meaning: Aloud." *Reading Horizons,* Vol. 21, No. 1 (Fall, 1980), pp. 7-11.

Osgood, C. "A Behavioristic Analysis of Perception and Language as Cognitive Phenomena." Contemporary Approaches to Cognition. Cambridge: Howard University Press, 1957.

Perfetti, C. A. and Goldman, S. R. "Discourse Memory and Reading Comprehension Skill." *Journal of Verbal Learning and Verbal Behavior,* Vol. 14 (1976), pp. 33-42.

Riley, J. A. and Lowe, J. D., Jr. "A Study of Enhancing Vs. Reducing Subvocal Speech During Reading." *Journal of Reading,* Vol. 25, No. 1, October, 1981, pp. 7-13.

Ringwald, L. O. Covert Speech In the Beginning Reading Process. Dissertation Abstracts International, 1978, Apr., Vol. 38 (10-A), p. 5914.

Smith, F. Understanding Reading (2nd ed.) New York: Holt, Rinehart and Winston, 1978.

Spache, George B. *Diagnosing and Correcting Reading Disabilities.* Boston: Allyn and Bacon, Inc., 1976.

Tarver, S. C., Hallahan, D. P., Cohen, S. B., and Kauffman, J. M. The Development of Visual Selective Attention and Verbal Rehearsal in Learning Disabled Boys. *Journal of Learning Disabilities,* 1977, Vol. 10, pp. 491-500.

Uchida-Nobuko. The Effects of External and Internal Verbalization on Memory and Comprehension of a Story in Pre-School Children. *Japanese Journal of Educational Psychology,* June, 1975, Vol. 23, No. 2, pp. 87-96.

Wells, J. L. "An Investigation of Subvocalization During the Silent Reading Process." *Dissertation Abstracts International,* Vol. 38, No. 6, p. 3392.

WHAT RESEARCH SAYS TO THE DISCIPLINARIAN

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The noted social scientist, Albert H. Burrows (1961), briefly defines a scholarly discipline as any organized body of knowledge in a given field, and categorizes the scholarly disciplines under two broad headings: Sciences and Non-Sciences. Disciplines under discussion fall into both categories. The interrelatedness of these fields is well known. For example, the sciences of physics and mathematics are drawn upon for the technological discipline of a school of engineering or school of industrial arts; and the sciences of biology and chemistry are drawn upon for materials from which to organize the technology of a school of medicine, nursing, and other healing arts. Similarly, sociology, as a social science, is also a technology as it involves the principles governing group interactions and the effect on the behavior of the individuals and groups participating in them; thus, social service is the applied phase of sociology.

Scholars in the scienes and non-sciences express the belief that there is no substitute for the highly trained disciplinarian, and that in order to become a scholar in any field, one must possess a high level of reading comprehension. Almost four decades ago, Hall and Robinson (1945) reported one of the few analytic studies of the relationship between tests of general reading ability and reading in such disciplines as history, geology, art, and fiction. They identified at the college level the following reading skills: attitude of comprehension accuracy, word meaning, rate of inductive reading, rate for unrelated factors, and chart-reading. Both concluded that reading skills for prose and non-prose were different.

More recently, however, Shepherd (1963) pointed out that reading per se has no content of its own, and must draw from the subject matter disciplines. Therefore, in order to comprehend the materials, one must have a set of reading skills common to all disciplines and also a set of skills peculiar to each discipline. Muelder (1966) agrees with this position, and cites, for example, mathematics as requiring extensive and intensive reading, since data are cumulative with knowledge building on other knowledge, and the student must get complete understanding as he progresses in the subject matter. "Because a single word may change the whole meaning in mathematics," says Muelder, "every single word is crucial." This may not be true in social science.

In the field of science, the student is lost if he does not see the organization of information, classification, sequence, explanation of a process, detailed statements of fact, the main idea, details as they relate to the main idea, or is unable to make inferences, and accurate generalizations. In fact, each discipline contains a technical vocabulary which the student must master, if he is to become competent in it.

This review addresses the question: What do we know about the relationship of reading comprehension as measured by standardized test scores to grade point averages of students in engineering, business, mathematics/science, in sociology, and history? Efforts to uncover systematic replications of studies to support theoretical constructs on the predictive validity of standardized reading tests to grade point averages were practically futile. However, the literature contains numerous studies in a combination of disciplines which may or may not duplicate the exact subjects under consideration here.

Grade point average in this review is used as the criterion variable. Both Anastasia (1968) and Lanvin (1966) suggest that academic performance, as indexed by grade point average (GPA), is subject to analagous difficulties, not only because of the subjective criteria that may enter the grading process by different teachers, but because of the uncontrolled sources of variation in or across disciplines. Lanvin (1966) goes a step further to question whether it is meaningful to compare averages of students across disciplines, suggesting that it might be more appropriate to study the determinants of performance within subject matter disciplines. Nevertheless, researchers continue to utilize linear correlation and multiple-regression procedures in their studies.

Citing both the College Ability Test (CAT) and the Scholastic Aptitude Test (SAT) as examples of predictive tests now being subjected to widespread debate and criticism, Bracey (1980), Wickenden (1980), and Stanley (1981), while acknowledging that high school grades have always been a better predictor of academic success in college, suggest that the SAT does in fact predict first year GPA's with the average correlation usually given as .41.

Stanley (1981) of Johns Hopkins bases his faith in the SAT on scores of thousands of precocious youngsters who entered his mathematics programs from junior high school, and who are now—at age 17-18—undertaking Ph.D. degrees at Rutgers, Stanford, Columbia, etc. "The SAT predicts rather well," said Stanley, "which students can move ahead successfully at a fast pace in subject matter too difficult for the typical youth their age." (p. 10)

A report by Slack and Porter (1980) of Harvard casts serious doubt on the foregoing assertions. Their data in eleven studies indicate that the predictive contribution made by the SAT is indeed small, and that superior predictions can be made from a combination of grades and achievement tests. In commenting on the use of tests as predictors of GPA's, Anastasia (1968) contends that no distinction between aptitude and achievement tests can be rigidly applied, since both types are highly verbal in nature. She further states that the STEP, ACT, OSUPT, MAT, and the ITED all sample a combination of general aptitudes and knowledge about subject matter in the major disciplines. Within this general framework, then, the studies reviewed below attempt to answer the question: Do standardized test scores predict GPA's of college students in various disciplines?

STUDIES INVOLVING TESTS AS PREDICTORS OF GPA'S

The specific objective of a study undertaken by D'Amico, Bryant, and Prahl (1959) was to determine how well the Multiple Aptitude Test (MAT) correlated with grades in junior college subjects. Test results of 450 students at Flint Junior College and their subsequent grades provided the data for the study. Means, standard deviations, Product-Moment Correlations, and Multiple Correlations were computed. The results showed a range of single validity coefficients varying from -.01 to .73. Additionally, the Verbal Comprehesion Factor contributed significantly to prediction of academic success in Biology, General Business, Psychology, English Composition, Foreign Language, and Drawing; while Test 6, Arithmetic Computation, contributed significantly to the prediction of success in Mathematics, Accounting, Social Sciences, and Business Mathematics. GPA's in each of the subject areas approximated the letter grade of "C," with the standard deviation varying from .97 in Drawing to 1.7 in Psychology. Thus, D'Amico and associates (1959) concluded that MAT scores have from moderate to high validity in relation to achievement in junior college subjects.

During the same year, the Iowa Silent Reading Tests, Advanced Form, were among the seven predictors of GPA's of freshmen nursing students at the Trumbull Memorial Hospital in Warren, Ohio in astudy by Garrett (1960). Other predictors in the study were: Ohio State University Psychological Tests, Form 21; George Washington University Test Series; Arithmetic Test for Prospective Nurses, Fom 1; Minnesota Vocational Test for Clerical Workers; MacQuarrie Test for Mechanical Ability; Shipley-Hartford Retreat Scale; and High School GPA's. Multiple Correlations resulted in an 0.641 coefficient for High School Grades, the Iowa Silent Reading Test, the Hunt Arithmetic Test, and the Minnesota Clerical Test as being the most practical predictors in combination. Excluding high school grades, however, the most practical predictors of first year grades in this study include the Ohio State Psychological Test, the Hunt Arithmetic Test, the Iowa Silent Reading Test, and the Shipley-Retreat Scale, which together yielded a multiple R of 0.435.

Reid, Johnson, Entwisle, and Angers (1962) reported a study in which 410 freshmen at Newark College of Engineering obtained a verbal mean score of 493.3 on the SAT; verbal score of 39.3 on the CAT, Form I-A; and a Composite mean reading score of 28.1 on the Cooperative English Test, C-2. Those entrants obtained a higher mean math score on both the SAT (576.7) and the CAT (42.5) than on the verbal sections. The study failed to show a positive relationship between reading or math scores and GPA's, since 124 or 30 percent of the students were dismissed for unsatisfactory performance (GPA's of -1.25) prior to graduation. In fact, drop-outs at the end of the first semester fell significantly below the entering class mean in mathematics on the SAT, and CT as well as on the entering class mean on the verbal sections of both the CAT and the Cooperative English Test.

A study by Greenwood (1962) utilized the Buffalo Reading Test (BR); the verbal and quantitative sections of the ACE; the SAT; and the Engineering and Physical Science Tests as predictors of GPA's of 444 students who entered the chemical electrical, and mechanical curricula of the Broome Technical Community College, Erie County Technical Institute, and the New York City Community College of Applied Arts and Sciences. The highest correlations for the BR and GPA's was .60 and .70 for the Broome Technical Electrical Class and the Broome Technical Chemical Class respectively. No other correlations including the reading test were shown. The author recommended that each technical college develop its own predictors, separately.

Lepley (1965) used GPA's of entering freshmen to establish the predictive validity of the Synonym Vocabulary Test, Form I and Form II. The students were divided into four groups: liberal arts, engineering, science, and non-science. The results indicated that the range of inter-reliabilities between the two forms was from .82 to .90 with the four groups. In correlating the tests with GPA's, Lepley concluded that the usefulness of the tests was better for liberal arts students (Form I, .39; Form II, .38) and for science students (Form I, .46; Form II, .51) than for non-science and engineering students.

A total of 520 students comprised the sample from which Borup (1971) drew data concerning their ACT scores and first semester college GPA's among other variables. Analysis of Variance was computed to determine the amount of relationship between the variables. Comparisons of mean-quarter rankings of male and female students revealed that females exceeded the males in their high school achievement (2.11 vs 1.76), although males scored significantly higher than females on the ACT cumulative and the various sub-scores with the exception of the English portion. Males obtained a lower (1.93) first semester GPA than females (2.31), the F value being 25.69 with significance greater tan .05. Other variables were studied in this report such as sex and race. However, they are not germaine to the present study.

The predictive validity of three new tests with GPA's in selected courses was investigated by ABU-SAYF and George Za'Rour (1975) of the American University of Beirut. Tests were: The English Proficiency (ER), the Quantitative Aptitude Test (AQ), and the Science Proficiency (AS). The participants were 271 freshmen and sophomores enrolled at the University. Results showed that the EP Test predicted grades in English 201 at a higher level of accuracy than other English courses; AQ was found to be a valid predictor of grades in mathematics courses; and Form 886 of the AS Test proved to be a more valid predictor of GPA than was Form 885. Critical ratios between means suggested that science students performed significantly ($p < .01$) better than did the art students. In general, a low to moderate predictive validity for each of the tests was obtained.

Sherrell (1981) investigated the relationship of the N-D Reading Test total mean score and GPA's of 267 students enrolled in three Vocational/Technical Schools in Missouri, and found that as a group, they performed at a total grade equivalent of 10.9. Students in individual courses earned the following TGE's: Agriculture—9.5; Auto Body—9.1; Auto Mechanics—10.4; Electrical Engineering—12.3; Heating and Air-conditioning —10.0; and Licensed Practical Nursing (LPN)—13.5. Of the total sample, 48 or 18% earned A's; 109 or 41% earned B's; 86 or 32% earned C's; 16 or 6% earned D's; and 8 or 3% were dropped (perhaps earning F's). Sherrell complained that all textbooks used by these students had readability levels above the students' reading levels as measured by the N-D, and that the high scores made by students were due to the individualized attention, the use of supplementary reading materials, and teacher demonstrations.

Two final studies were reported by Geer (1981) and Jones (1981) in which different statistical analyses were made to determine the predictive validity of the N-D Tests for GPA's of their majors. In the Geer study (1981) a simple linear regression analysis was performed between Nelson-Denny total mean reading scores and GPA's for 141 LeTourneau College students in Engineering (65), Business (45), and Math/Science (31). Statistical significant correlations were found between GPA's and test scores (.37, .60, .66 respectively) in each discipline at the <.01 level, indicating low to moderate predictive validity of the Nelson-Denny Reading Test for GPA.

SUMMARY

This review has been concerned with a small sample of studies undertaken in four decades—from 1959 to 1981,—to assess the relationship of reading comprehension test scores to GPA's of students majoring in Engineering, Business, History,

Sociology, Math/Science. Studies briefly reviewed include both single and multiple batteries of standardized tests as predictors of academic success as determined by grade point averages.

Of the thirteen studies mentioned only six showed moderate to high predictive validity of the tests involved; while seven showed little or no predictive strength for the tests.

Both Alexander (1976) and Walker (1981) concur with Lanvin (1966), Anastasi (1968), Astin (1971), Chansky (1973), and Baird (1979) in the belief that factors other than reading test scores have significant impact on predicting academic success of college students, and that test scores play only a supportive role in the matter of prediction. In fact, Lanvin (1966) and Glaser (1979)—more than a decade—later both expressed the view that efforts to improve predictive and diagnostic validity have run into diminishing returns, and hint that further progress may come only through systemtic theorizing about the determinants of academic performance. One implication, as seen by this author, is for replication by reading counselors usng identical tests, methodologies, majors, and (as far as possible), similar populations in similar colleges. Until this is done consistently, there is likely to be continued speculations and skepticism in the use of test scores as valid (sole) predictors of academic success at any level.

REFERENCES

ABU-SAYF and Georga Za'Rour. Predictive Validity of the American University of Beirut Trial Aptitude Battery. *Educational and Psychological Measurements,* 1975, *35.* 451-454.

Adams, Effie Kaye. The Reading Performance of Student Teachers in A Developing Institution, in Schick, George B. and May, Merrill (Eds.) *Junior College and Adult Reading Programs| Expanding Fields.* Seventeenth Yearbook of the National Reading Conference, 1967, 47-57.

Alexander, H. T. The Relationship of Reading and Other Factors to Academic Achievement, *Reading World,* 1976, *15,* 304-309.

Anastasi, Anne. *Psychological testing.* (New York: Macmillan Publishers, 1968).

Astin, Alexander W. *Predicting academic performance in college.* (New York: Free Press, 1971).

Baird, Leonard. Development of an inventory of documented accomplishments for graduate admissions. (Princeton, New Jersey: Educational Testing Serving, 1979).

Borup, Jerry. The Validity of American College Test for Discerning Potential Academic Achievement Levels—Ethnic and Sex Groups. *Journal of Educational Research,* 1971, 65 (1), 3-5.

Bracy, Gerald W. The SAT, College Admissions, and the Concept of Talent: Unexamined Myths, Unexplained Perceptions, Needed Explorations. *Phi Delta Kappan,* 1980, *62,* (3), 197-198.

Burrows, Albert H. Science and Scholarship: Interdisciplinary Relationships. Journal of Educational Sociology, 1961, 35, 181-188.

Chansky, Norman. Resolving the Grading Problem. *Educational Forum,* 1973, *37* (2), 189-194.

D'Amico, Louis A., Bryant, J. Howard, And Prahl, Marie. The Relationship Between MAT Scores and Achievement in Junior College Subjects. Educationnl and Psychological Measurements, 1959, *19* (4), 611-614.

Garbarino, James. The Meaning and Implications of School Success. *Educational Forum,* 1976, *40,* 157-167.

Garrett, Wiley S. Prediction of Academic Success in a School of Nursing. *Personnel and Guidance Journal,* 1960, *38,* 500-503.

Geer, Carolie. Predicting Grade Point Averages of Majors in Engineering, Business, Science/Mathematics Through the Use of Reading Comprehension Tests. Paper presented at the second annual conference of the American Reading Forum, Sarasota, Florida, December 12, 1981.

Geis, Lynna and Carney, Myrna L. Reading ability, college grades, and attrition: A two year study. in Michael Kamil and Alden Moe (eds.) 28th Yearbook, National Reading Conference, 1979, 163-167.

Glazer, Robert. Trends and Research Questions in Psychological Research on Learning and Schooling. *Educational Researcher,* 1979, *8,* (10), 6-13.

Greenwood, Robert L. The prediction of academic success in the Technical curricula of community colleges: An investigation of the prediction of academic success in the chemical, electrical, and mechanical curricula of three community colleges in New York stat. Doctoral Dissertation, New York University, 1962. D.A. 23:898-899.

Hall, William and Robinson, Francis. An analytical approach to the study of Reading Skills. *Journal of Educational Psychology,* 1945, *36,* 429-442.

Hansmeier, Thomas. The Iowa Tests of Educational Development as predictors of college achievement. *Journal of Educational and Psychological Measurement,* 1960, *20* (4), 843-845.

Jones, Rubye Jo. Comparison of reading comprehension test scores and grade point averages of majors in history and sociology. Paper presented at the second annual conference of the American Reading Forum, Sarasota, Florida, December 12, 1981.

Lanvin, David E. The prediction of academic performance. (New York: The Russell Sage Foundation, 1965).

Lepley, William. Delayed validation for the Synonym Vocabulary Test, Form I, Form II. *Journal of Psychology,* 1965, *59,* 329-331.

Muelder, Richard. Helping students read mathematics. In H. Alan Robinson and Sidney Rauch (eds) Perspectives in Reading in the High School Classroom, No. 6. (Newark, Delaware: International Reading Association, 1966).

Reid, John, Johnson, A.P., Entwisle, Frank, and Angers, William P. A Four Year Study of the Characteristics of Engineering Students. Personnel and Guidance Journal, 1962, *41,* 38-43.

Shepherd, David. Reading in the content areas: Instruction and application. In Clay Ketcham (ed) Proceedings of the College Reading Association, 1968, *9,* 43-47.

Sherrell, Eugene. Long-Neglected factor: Reading ability of vocational students. *Phi Delta Kappan,* 1981, *63* (2), 140-141.

Slack, Warner and Porter, Douglas. The scholastic aptitude test: A critical appraisal. *Harvard Educational Review,* 980, May, 154-75.

Stanley, Julian C. Using SAT to find youths who reason extremely well mathematically: A report on the Johns Hopkins University Mathematics program. Human Intelligence International Newsletter, July/October, 1981, p. 10.

Walker, Mary Margaret. Different Strokes: Raising the level of expectations of college students as a factor in improving reading comprehension scores and grade point averages in various disciplines. Paper presented at the second annual conference of the American Reading Forum, Sarasota, Florida, December 12, 1981.

Wickenden, James. How the SAT's are used—and sometimes abused. Chronicle of Higher Education, September 29, 1980, p. 56.

PREDICTING GRADE POINT AVERAGES OF MAJORS IN BUSINESS, ENGINEERING, AND SCIENCE/MATH THROUGH THE USE OF READING COMPREHENSION TEST SCORES

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The reading program of LeTourneau College, though an important part of the college curriculum, does not serve every student on campus. The College's reading program focuses on entering freshmen students whose reading skills fall below the 13.0 grade level on the Nelson-Denny Reading Test A. The Department of English administers the test each fall and assigns students reading below 13.0 to the one-semester reading lab. Students scoring slightly above 13.0 are encouraged to take the reading course; some stronger students even volunteer to take the course primarily to improve their reading speed and vocabulary. Some of the students who are required to take the reading lab are also enrolled in a remedial English course on the basis of their ACT scores. Implied within the process of this testing and course assignment on the basis of reading scores is the basic philosophy of the Department of English that reading skills are important to a student's college career.

Situated in Longview, Texas, LeTourneau College is primarily a non-denominational Christian engineering college, with electrical, welding, and mechanical engineering options

accredited by the Accreditation Board for Engineering and Technology. Science and math programs support this engineering emphasis as well as training their own majors in biology, chemistry, physics, and medical technology. The division of business is newer to the college curriculum than engineering, but it is growing rapidly in popularity with majors in accounting, industrial management and business administration.

As one might expect, the student body represents a great geographical diversity among its predominately male population. In the Spring 1981, every state except Nevada and Hawaii was represented in 899 students (131 from Texas, 87 from Pennsylvania, 64 from California, 59 from Illinois, and even 39 from Florida). Another 61 students came from 27 foreign countries (22 from Canada, 9 from Central America, 8 from South America, 6 from Africa, and 6 from Europe among the larger groupings). The total Spring 1981 enrollment consisted of 960 students, 856 male and 104 female.

Most of the students receive some economic aid in the form of National Defense loans, individual state loans, BEOG grants, and private scholarship funds. About 70 percent of the students work either through the campus work-study program or off-campus in a variety of Longview area businesses and industries. Most of the students are highly motivated, carrying an average of 15 credit hours in the Spring 1981, and involved in both campus and community programs and service projects. Over half of the students participate in the highly competitive campus intramural sports program.

The purpose of this research is to determine the predictive value of the Nelson-Denny reading scores in relation to the grade point averages (GPA) in the divisions of engineering, science/math, and business at LeTourneau College. The Nelson-Denny total scores were taken from Test A between the years 1977 and 1980. The Spring 1981 GPAs of declared majors in each division, predominately junior and senior students, were used.

Using extant scores, sixty-five students (2 female) in engineering, 45 students (6 females) in business, and 31 students (14 females) in science/math had available Nelson-Denny scores as entering freshmen and "declared major" status in Spring 1981. Because of the low percentage of females in each division, it was decided that sex was not a variable. Also, since all students who made below 13.0 grade level were required to take reading lab, it was not practical to do a correlation between those taking reading lab and those not taking it. In fact, only two students in engineering, two in science/math, and none in business who scored above the 13.0 grade level took reading lab on their own initiative. Nor was any correlation run between the divisions, since the results of such a comparison would be too ambiguous to be scientifically meaningful.

The basic assumptions which form the conceptual framework of the study are as follows:

1. The Nelson-Denny reading test accurately and reliably measures reading skills.
2. GPA accurately measures academic success.
3. Reading skill has a significant relationship to academic success.
4. Verbal skills are equally important in each of the three divisions (business, engineering, science/math).

On the basis of these assumptions, the following hypotheses were formulated:

Hypothesis I. The higher the total percentile Nelson-Denny reading score, the higher the corresponding GPA for each student.

Hypothesis II. The Nelson-Denny reading test significantly predicts academic success (GPA).

To ensure as much standardization as possible in the research, all of the students took strictly timed Nelson-Denny reading tests their first semester at LeTourneau College. The percentile total score was chosen for this research project rather than the grade level as a more accurate measurement of reading skill because the grade levels included too great a diversity of percentile rankings, especially at the 14+ grade level (67 to 99+ percentiles).

To measure the relationship between the Nelson-Denny total percentile reading score and the subsequent GPA for each student, a simple linear regression was run for each of the three divisions.

The results of a *t* test (see Table 1) indicate that this correlation between the Nelson-Denny total comprehension score and the GPA is significant in each division at the .01 level.

Hypothesis I. When one reviews the actual distribution of the individual scores, one discovers that there are individual exceptions to the actual norm. In other words, there are some students in each division who have scored above the Nelson-Denny mean precentile for each group, but whose GPA's have fallen below the group mean. Nevertheless, the hypothesis is accepted because engineering is .37; science/math is .66; business is .60. Surprisingly, business majors have the lowest mean percentile on the Nelson-Denny. One might have expected business students to have better developed verbal skills than engineering or science/math students. It may be, however, that they are merely less observant or less accurate readers on the whole. The proof of this notion, nevertheless, will be left to another study.

Hypothesis II. Because of the wide scattering of the data points ("noise"), one must exercise caution in using the Nelson-Denny reading test alone to predict academic success in terms of GPA. The Nelson-Denny is a significant tool, however, in predicting GPA. Because the test was timed, the predictive value may have been distorted. The timed test cannot account for the slow reader who is diligent in his studies nor for a fast, accurate reader who lacks either motivation or study skills. Yet the strength of the overall results indicates that the hypothesis is acceptable.

In conclusion, a word of caution must be given. Students are not highly predictive; psychological, emotional, and physical factors play as much a part in college success as do the mental factors of intelligence, knowledge retention, and literacy. Also, it is easy for the researcher to forget that each reading score represents a new student far from home, in a new environment, among strangers, who might have done better, or even worse in some cases, on another day, at a different time, or under other circumstances. For these reasons, perhaps, one finds a student with a mere 20 percentile Nelson-Denny total score making a 2.8 GPA. It is more difficult to account for the aberrant behavior of the student who scored in the 70 percentile on the Nelson-Denny, but who made a 1.7 GPA. For this reason, other tools may be better predictors. Nevertheless, these exceptions do not diminish the fact that the correlation between the Nelson-Denny total reading score and the subsequent GPA is highly significant, indicating that the test predicts, with reasonable accuracy, the potential academic success of an entering student at LeTourneau College.

	N	$\bar{X}$	$\bar{Y}$	r
Business	45	59.33	2.72	.60
Engineering	65	64.22	2.82	.37
Science/Math	31	67.45	3.12	.66

N=Number of students
$\bar{X}$=Nelson-Denny %-tile
$\bar{Y}$=GPA

MODE OF DISCOURSE EFFECTS ON WRITTEN SYNTACTIC COMPLEXITY

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Kellog Hunt's T-unit hypothesis has been used as the basis of much of the research on the syntactic elements of writing development. Hunt's (1965, 1970, 1977) assertion that mean words per T-unit (W/TU) tends to increase with age and skill of the writer has been supported by other researchers (Blount, Johnson, & Frederick, 1968; Braun & Klassen, 1973; Loban, 1976; O'Donnell, Griffin, & Norris, 1967; Stewart, 1978, Veal, 1974), and Hunt's indexes of syntactic maturity have been used as "norms" in numerous methodological studies of sentence combining (Maimon & Nodine, 1978; Mellon, 1969; O'Hare, 1973; Stotsky, 1975).

Hunt (1965) used written products from students' regular class assignments; so many types of writing were represented in his studies. He did not identify the purposes or types of writing represented except in general terms. Recent attention to the importance of purpose in writing has led some researchers to examine the effect of factors such as mode of discourse or purpose on syntactic complexity in writing. San Jose (1973) and Perron (1977) examined the effect of mode of discourse on the syntactic complexity of the writing of elementary school students. Results of both studies indicated that mean W-TU length was greatest in argument, followed by exposition, narration, and description. Rosen (1969) found that high school students produced longer T-units in referential writing than in expressive writing, and Crowhurst and Piche (1979) found that T-unit length was significantly greater in argument than in narration at both grades 6 and 10.

Crowhurst (1980) examined teachers' quality ratings of papers in various modes and found that ratings were highest for syntactically more complex papers in the mode of argument but not in the mode of narration. She proposed that when individuals write persuasive discourse, they are engaging in an activity which inherently requires the logical interrelationship of propositions. This results in T-units which are lengthened by the subordination of clauses and other elements. She concluded that argument or persuasion places greater demands on writers to make use of their syntactic resources than does narration, and that there is a positive relationship between effective argumentative discourse and the ability to relate propositions syntactically.

The present study was designed to examine the effect of mode of discourse and age and ability of student writers on syntactic complexity. The two modes of discourse chosen for this study were persuasion and description. These modes were selected because, in the studies of San Jose (1972) and Perron (1977), persuasion was found to be the most syntactically complex and description was the least syntactically complex. Therefore, it was proposed that maximum difference between the two modes would be exhibited.

Two other aspects of development in writing were considered in this study, composition length and rate of syntactic error. A positive relationship between composition length and development in writing has frequently been noted (Diederich, French, & Carlton, 1961; Gebhardt, 1978; Stewart & Grobe, 1979). In this study, words in each composition were counted and length of composition was considered a variable in measuring growth in writing.

Two types of sentence errors were chosen for analysis in this study. These two errors, sentence fragments and run-on sentences, were chosen for analysis in this study because they are common errors in students' writing (Kagan, 1980; Shaughnessy, 1977) and because they probably reflect students' efforts to coasolidate T-units.

Research Questions

This study addressed the following research questions.

1. What is the effect of mode of discourse on syntactic complexity, length of composition, and incidence of sentence-production errors?
2. Are there grade level differences in syntactic complexity, length of composition, and incidence of sentence-production errors?
3. Are there ability-group differences in syntactic complexity, length of composition, and incidence of sentence-production errors?
4. Is growth in syntactic complexity associated with changes in rates of sentence-production errors, grade level, mode of discourse, and syntactic complexity?

Method

A total of 295 students in four 7th-grade classes (95 students), four 9th-grade classes (104 students), and four 11th-grade classes (96 students) each wrote two compositions, one in the descriptive mode and one in the persuasive mode. The total number of writing samples analyzed for this study was 590. Two of the classes at each grade level were identified as the high-ability group, and two were identified as the low-ability group. These designations were made based on the national norm percentiles of the reading and language subtests of the *Iowa Test of Basic Skills* and the *Test of Achievement and Proficiency*.

The writing assignment items used in this study were selected from those developed for the 1973-1974 National Assessment of Educational Progress (NAEP). Students in all three grade levels wrote on the descriptive item. Students in grades 7 and 9 wrote on a persuasive item in which they were asked to write to the school principal about a change they would like to make in their school, and the 11th graders wrote to apply for a job.

The data for this study were collected during a 2-month period in the first semester of the school year, 1980-1981. Each group of students wrote in response to the descriptive item, and within 1 week, wrote in response to the persuasive item.

Analysis of the Data

To determine composition length, words were counted for each composition. Compositions were segmented into T-units using criteria developed by Mellon (1969) and mean W-TU was determined for each paper. Run-on sentences and sentence fragments were identified in each paper. The number of errors in each paper was divided by the number of T-units in each paper to arrive at a ratio of run-on sentences per T-unit (R/TU) and sentence fragments per T-units (F/TU).

Means and standard deviations were determined for each grade level, each ability level, and each mode of discourse for the four dependent variables, composition length (W), words per T-unit (W/TU), run-on sentences per T-unit (R/TU), and fragments per T-unit (F/TU). A $2 \times 2 \times 3$ analysis of variance was done. When a significant F-ratio was obtained, Tukey's

Length of Composition

The analysis of variance yielded a significant main effect for mode of discourse, $F(1,578)=159.05$, $p < .0001$, grade level $F(1,578)=89.48$, $p < .0001$, and developmental level $F(1,578)=47.00$, $p < .0001$. Tukey's test for multiple comparisons indicated that there were significant differences between the means of the two modes, the two developmental levels, and the three grade levels, $p < .05$. Longer compositions were written in the descriptive mode and in the high developmental group $p < .05$.

There were significant differences $p < .05$ between each combination of grade level groups, 7 and 9, 9 and 11, 11 and 7 $p < .05$. The longest compositions were written by the 11th-grade students; the next in length were written by the 9th-grade students; and the shortest papers were written by the 7th-grade students.

Syntactic Maturity

The analysis of the variance for words per T-unit yielded a significant main effect for mode of discourse, $F(1,578) = 19.11$, $p < .0001$. Tukey's test indicated that there were significantly more words per T-unit in the persuasive mode than in the descriptive mode, $p < .05$. The interaction was significant for mode of discourse and grade level $F(2,578) = 16.63$, $p < .0001$. An analysis of simple effects revealed that there were significant differences among grade levels in the descriptive mode. This analysis yielded a significant main effect for grade level $F(2,292) = 47.64$, $p < .0001$.

Tukey's test indicated that there were significant differences between all three grade level combinations, 7 and 9, 9 and 11, and 11 and 7, $p < .05$. Papers in grade 11 contained more W/TU than the 9th-grade papers, and the 9th-grade papers contained more W/TU than the 7th-grade papers. Developmental tendencies like those found by Hunt (1965) and O'Donnel et al. (1967) were present in papers written in the descriptive mode. The analysis of simple effects revealed that there were no significant differences among the grade levels in the persuasive mode. All papers were high in W/TU in the persuasive mode: 7th grade—15.19; 9th grade—15.73; and 11th grade—12.28. The drop in the W/TU in the 11th-graders' papers could have been caused by the change in item. The item used in grades 7 and 9 was clearly persuasive, calling for students to persuade the principal of a needed chnge in the school. The 11th-grade item in which students wrote for a job elicited many a sentence in which students gave information about where they might be contacted and other information. This explanatory information was much less complex than the persuasive parts of the letters and may have accounted for the lower mean W/TU in the 11th-grade writing.

Run-on Sentences

The analysis of variance for run-on sentences per total T-units yielded a significant main effect for grade level $F(2,578) = 8.66$, $p < .01$ and developmental level $F(1,578) = 38.36$, $p < .0001$.

Tukey's multiple comparison tests indicated that there were significant differences $p < .05$ between the two modes of discourse, between the two ability levels, and between grades 7 and 11 and 9 and 11. There were no significant differences between grades 7 and 9. There were more errors in the descriptive mode, in the average developmental group and in grades 7 and 9.

Sentence Fragments

The analysis of variance for fragments per T-unit yielded a significant main effect for ability level $F(1,578) = 17.67$, $p < .0001$. The Tukey's multiple comparison tests indicated that there were significant differences between grades 9 and 11, $p < .05$. Compositions from grade 9 contained significantly more fragment errors than compositions from grade 11. Papers from the high ability level contained significantly fewer fragment errors than those from the average developmental group. There was no significant difference between the two modes.

Conclusions

Results of this study lend support to the following conclusions.

1. Other researchers (Diederich et al., 1961; Gebhardt, 1978; Stewart & Grove, 1979) noted a positive relationship between composition length and age and ability of the student writer. In this study, the length of the students' compositions increased at each grade level and in the higher ability groups.

2. Mode of discourse does have an effect on syntactic complexity. In this study, as in those by Rosen (1969), San Jose (1972), and Perron (1977), mode of discourse significantly affected syntactic maturity as measured by mean W/TU. This study supported the assertion of Crowhurst (1980) that persuasive writing inherently calls for the interrelationship of propositions and that this is expressed syntactically by the subordination of clauses and less-than-clausal elements. Mode affected length of composition also. Compositions in the descriptive mode were longer, but this may have been because the persuasive assignment was in the form of a letter.

3. Mode of discourse also had an effect on run-on sentence errors. There was a larger percent of run-on sentences in the descriptive mode. If persuasion does call for more subordination than description does, it follows that descriptive writing would rely more on the coordination of T-units than persuasive writing would. Coordination errors were the ones measures by this analysis of run-on sentence errors. An error analysis directed toward errors in subordination might find more errors in the persuasive mode.

4. Developmental differences among the grade levels were not present in the persuasive mode but they were in the descriptive mode. The findings of Hunt (1965, 1970, 1977), O'Donnell et al. (1967), and Mellon (1969) concerning development in mean W/TU were supported by data from the descriptive mode but not from the persuasive mode. All scores in persuasive writing were high. The 7th-grade scores were as high as the 9th- and 11th-grade scores. Perhaps when the rhetorical situation calls for it, the writing of younger writers can be as complex as that of older writers. The drop in 11th-grade persuasive mean W/TU score was probably affected by the assignment item. The 11th-grade item elicited a more explanatory type of writing than the clearly persuasive items used in the 7th and 9th grade.

5. The oldest students and students in the higher within-grade group made fewer sentence errors. Students demonstrated developmental tendencies in their mastery of the "print code." Differences were not great between grades 7 and 9. Both types of errors dropped off dramatically in the 11th-grade papers.

6. Developmental differences between high and average groups are present in error rates and length of composition. The students in the high group produced more words in their compositions and fewer errors. They also produced more W/TU in the descriptive mode.

Implications

The following implications were made from this study.

1. The purposes people have when they compose probably affect the most basic decisions they make when composing. In this study, purpose of mode affected even such a basic element as syntactic choice. Purpose probably affects other choices in writing. Much writing instruction and research has assumed that "good" writing is all the same. Recent theorists propose that the choices we make when we write are based upon what we hope to achieve in a particular piece of writing. Purpose in writing is not considered in Hunt's work and is often not considered when indexes of syntactic maturity are applied to writing samples. This study lends support to the idea that purpose must be considered as an important factor in writing research.

2. Good writing by adults is characterized by conciseness. Skilled writers work very hard to find the best way to say the most they can in the fewest words. Sometimes this demand for conciseness is conveyed to young writers. This study indicated that verbal skill by young writers is often demonstrated by volume of words. Perhaps this need to write many words reflects verbal development and should not be discouraged in

young writers.

3. Run-on sentence errors seem to occur when students repeat subjects or other sentence elements in order to sustain ideas across T-units. Developmental practice in ways to consolidate to create fewer, longer T-units may help students in that they do not have to sustain ideas across so many T-units. Thus, sentence combining may be a useful technique for helping students eliminate certain kinds of errors.

Since errors seemed to occur when students were involved in trying to subordinate and coordinate clauses, it might be profitable to link studies of students' errors to studies of sentence combining. The effects of practice in sentence combining may increase syntactic error over the short-term because students are trying new skills (Maimon & Nodine, 1978), but this study indicated that the errors may be related to a lack of skill in combining ideas. The error sentences were also characterized by many short T-units beginning with personal pronouns. Hunt (1965) proposed that the writing of young people may contain so many personal pronouns because of the necessity to maintain meaning across T-units. This stringing together of short T-units was characteristic of the run-on sentences in this study. It has often been difficult to measure progress in writing after instruction in sentence combining. Perhaps the study of students' errors should be measured after longer periods in which sentence combining was part of the instruction to see if mastery in ways to combine ideas means fewer errors in written composition.

REFERENCES

Barritt, L., & Kroll, B. Some implications of cognitive-developmental psychology for research on composing. In C. R. Cooper & L. Odell (Eds.), *Research on composing: Points of departure.* Urbana, Ill.: National Council of Teachers of English, 1978.

Blount, N. S., Johnson, S. L., & Frederick, H. C. *A comparison of the writing of eighth- and twelfth-grade students* (Technical Report No. 78). Madison: University of Wisconsin, 1968. (ERIC Document Reproduction Service No. ED 035 652)

Braun, C., & Klassen, B. A transformational analysis of written structures of children representing varying ethnic-linguistic communities. *Research in the Teaching of English,* 1973, *7,* 312-323.

Crowhurst, M. Syntactic complexity and teachers' quality ratings of narrations and arguments. *Research in the Teaching of English,* 1980, *14,* 223-232.

Crowhurst, M., & Piche, G. Audience and mode of discourse effects on syntactic complexity in writing at two grade levels. *Research in the Teaching of English,* 1979, *13,* 101-109.

Diederich, P. E., French, S. W., & Carlton, S. T. *Factors in judgment of writing ability* (Research Bulletin RB-61-15). Princeton: Educational Testing Service, 1961. (ERIC Document Reproduction Service No. ED 002 172)

Gebhardt, A. O. Writing quality and syntax: A transformational analysis of three prose samples. *Research in the Teaching of English,* 1968, *12,* 211-232.

Hunt, K. W. Early blooming and late blooming syntactic structures. In C.R. Cooper & L. Odell (Eds.), *Evaluating writing: Describing, measuring, judging.* Urbana, Ill.: National Council of Teachers of English, 1977.

Hunt, K. W. *Grammatical structures written at three grade levels.* Urbana, Ill.: National Council of Teachers of English, 1965. (ERIC Document Reproduction Service No. ED 113 735)

Hunt, K. W. *Syntactic maturity in school children and adults.* Chicago: Chicago Press for the Society for Research in Child Development, 1970.

Iowa Test of Basic Skills, form T. Hieronymus, A. N., & Lindquist, E. R. New York: Houghton, Mifflin, 1979.

Loban, W. *Language development: Kindergarten through grade twelve.* Urbana, Ill.: National Council of Teachers of English, 1976.

Maimon, E., & Nodine, B. Measuring syntactic growth: Errors and expectations in sentence-combining practice with college freshmen. *Research in the Teaching of English,* 1978, *12,* 233-244.

Mellon, J. C. *Transformational sentence-combining* (Research Report No. 10). Champaign, Ill.: National Council of Teachers of English, 1967.

O'Donnell, R. C., Griffin, W. J., & Norris, R. C. *Syntax of kindergarten and elementary school children:* A transformational analysis (Research Report No. 8). Champaign, Ill.: National Council of Teachers of English, 1967.

O'Hare, F. *Sentence-combining: Improving student writing without formal grammar instruction* (Research Paper No. 15). Urbana, Ill.: National Council of Teachers of English, 1973.

Perron, J. D. *Written syntactic complexity and the modes of discourse.* New York: American Educational Research Associaton, 1977. (ERIC Document Reproduction Service No. ED 128 827)

Rosen, H. *An investigation of the effect of differentiated writing assignments on the performance in English composition of a selected group of 15[16-year-old pupils.* Unpublished doctoral dissertation, University of London, 1969. (*Research in the Teaching of English,* 1979, *13,* 101-109.)

San Jose, C. P. M. Grammatical structures in four modes of writing at fourth grade level (Doctoral dissertation, Syracuse University, 1972). *Dissertation Abstracts International,* 1973, *33,* 5411A. (University Microfilms No. 73-9563)

Shaughnessy, M. P. Basic writing. In G. Tate (Ed.), *Teaching composition: Ten bibliographical essays.* Fort Worth, Tx.: Texas Christian University Press, 1976.

Stewart, M. Syntactic maturity from high school to university: A first look. *Research in the Teaching of English,* 1978, *12,* 37-46.

Stewart, M., & Grobe, F. Syntactic maturity, mechanics of writing, and teachers' quality rating. *Research in the Teaching of English,* 1979, *13,* 207-215.

Veal, L. R. *Syntactic measures and rated quality in the writing of young children.* (Studies in Language Education Report No. 8). Athens: University of Georgia, 1974. (ERIC Document Reproduction Service No. ED 090 555)

READING IN THE DISCIPLINES: A STRATEGIES APPROACH FOR DISABLED READERS

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The assessment of learners in difficulty demands that we examine what sets their learning apart. Is there something in their processing, something in the way they take in information and use it, that differentiates them from other learners? The question does not relate to inadequacy, but to differences in learning strategies and styles.

A problem-solving assessment process is used to examine characteristics which are difficult to identify in standardized testing. Clinically, we are not opposed to standardized testing; we need the information that traditional test structures generate; data are needed for instructional planning; and, systems operation requires pre-post documentation. Before we put children through traditional forms of testing, however, we want to establish the kind of relationship in which they can tolerate being taken to test ceilings, and pushed beyond them.

Some Ground Rules

Problem-solving imposes specific ground rules. FIRST, the focus is on process as well as response. There are many ways to solve a problem, each correct. Solutions may be totally unexpected but, by the same token, both defensible and profound. It's the process of thinking through a problem which is the critical mass, and it's that problem-solving strength that we seek to discover. Children arrive at many answers that diverge from, or extend the logic of, standard responses. If we can teach students to (consciously) use their own strengths, then the probability of getting appropriate (expected) answers is increased.

Second, models for learners-at-risk should start with strategies they use best, even though they may use them to solve problems that are not related to the subject matter at hand. The search, therefore, is for the students' successful thinking processes in areas that may have nothing to do with their academic life. After all, they have been [indirectly] telling us for years that standard methods don't work [for them].

"Strengths" has frequently been used by educators as a euphamism for "modality strength." [Do learners see better, hear better, touch better?] That's not our referent point. We're dealing with linked strategies making it possible for a teen-ager to get up in the morning and put his pants on correctly. What are the problem-solving devices that tell him where his clothes are, how he should get dressed, etc.?

THIRD, task solutions must operate on more than one level of logic. This is particularly true for youngsters who have experienced a great deal of failure, and are likely to give non-standard responses. Single-answer tasks lock that youngster into a learning cage from which there may be no escape. Presenting tasks which have many possibilities, where each answer reveals a different form of thinking, allowins for the structuring of situations (even at the diagnostic stage) in which there is much less likelihood of failure.

FOURTH, we have to set up task series which are hierarchical in nature, that is, each succeeding task should be more and more difficult. We want to be sure that the learner can be proud of finding appropriate solutions to tasks that are intrinsically worth-while. Neither the learner, nor the observers, should think, "Anybody can do that!"

One of the problems with traditional testing is that youngsters in trouble frequently can't even come close to their own grade level. You, and they, know that their test-ceiling is below that of their contemporaries. Therefore, in a problem-solving assessment we hve to select the kinds of tasks which allow us to take children to very high levels of thinking, where they have a sense (and everyone sitting around has a sense) that what they've done is important.

Our objective is to establish a series of procedures which make it possible for students to learn beyond their test ceilings. That is the centrality of the exchange. The way to create advocacy on the part of the observers is to work with materials and tasks that are relevant to school procedures and are of value to the students. The advocates must want to become partners in helping the child succeed at tasks which have long-range school, as well as short-range diagnostic, value.

FIFTH, parents and teachers, and even specialists, rarely have a chance to step back and watch the child at work. They're always the ones working with the youngster, and therefore they rarely have the perspective of the outsider looking at the learner's capabilities. What they do have, is the perspective of insiders with specific teaching objectives. Their commitment is to teaching, and if learning doesn't seem to take place, their frustration is as profound as the child's. In the case of the diagnostic process, their commitment is to observation, while somebody else teaches. The strategies used are replicable and, thus, can be tried (in the classroom and home) at some future date.

Frequently, teachers watching a specialist feel they don't have either the technique or the knowledge to carry out the same procedures. Specialists risk increasing the distance between themselves and those who have ongoing contact with the child—working teachers and parents. In a problem-solving exchange, strategies are selected that others can handle with ease, so there's more likelihood they'll actually be used.

Wouldn't it be wonderful if teacher training included courses like "Marketing" or "Motivational Research"? If we wanted to sell Corn Flakes, we would use models who liked Corn Flakes. Who needs an actor who'd tell us what's wrong with Corn Flakes every time they were mentioned? So, part of the issue of developing child advocacy (the SIXTH ground rule) is for the observers to agree on some positive elements about that child before the diagnostic exchange begins. Thus, we open a session with the question, "What's right about your child? Tell me what he or she does well." The answers help establish a mutually-agreed upon body of information related to specific acts.

It's not just a general, "I like children." It is, "I like THIS behavior in THIS child." For example, I like the way Mary starts her work (in school) right away," or, "I like the fact that John is always willing to help throw the garbage out (at home." Now we have a mutually agreed-upon, positive, valence. All too often, traditional diagnostic sessions (even the interview) focus on symptoms and negative learning characteristics. It is difficult to avoid negative test and performance expectations when stress, even though well intentioned, is the major initiator of the assessment process.

SEVENTH, there will be children who have difficulty no matter how carefully we structure the presentation of tasks. In a problem-solving process, where the guarantee is on success, we have to build contingency plans. What will we do if the youngster doesn't make it first crack out of the barrel? Obviously, we can't predict what we're going to find for every child. But we have to make educated guesses about the patterns displayed by learners in difficulty, so that we're prepared to step in when they experience frustration, or wander off course.

Problem-Solving Tasks

Students in difficulty often display extreme patterns. We all share learning strategies and characteristics, working along a continuum of learning. But, learners in trouble tend to polarize their behaviors—behaviors which are usually aphorized. People tend to call learners at one extreme "stubborn," and, at the other, "lazy" or "underachievers."

Beyond the appropriateness of student behavior, the question of learning characteristics is related to the production means by which we expect learners to output information. It has been the experience of most clinicians that children are often mis-identified or mis-labeled as a consequence of their responses to standardized questions, without much concern for the thinking processes that produced those answers. It is all too easy to decide that a youngster's problems lie in the realm of content, when answers seem bizarre or inappropriate.

In truth, however, many vulnerable learners function so uniquely that they defy standard categorization. They "see" dimensions to a problem that are hidden from examiners, teachers and parents; they utilize logic which may be foreign to the observing adults; they cannot cope with expected output systems, even when they are fully capable of understanding and processing the content of required subject areas.

One of the most revealing exercises in our problem-solving process involves an answer to the following task:

Instruction: Fill in the blanks in the problem.

Problem: P A T P E T P I T P — — — — —

Most adults, and just about every teacher who has ever looked at the problem answers in the following manner: P O T P U T. Indeed, failure to do so would usually be attributed to a child's difficulty with language or unfamiliarity with the vowels. Under actual test conditions, however, over half the students have responded with totally different, and totally correct responses.

The most common alternate is: P A T P E T P I T P M T P Q T. Almost every observing adult assumes that the answer is random and incorrect. Some problem solvers, however, notice that there are three intermediate letters between "A", "E", and "I". Mathematical logic, therefore, dictates a continuation of the pattern. Hence, "M" and "Q". If the problem is only to identify vowels the answer is inappropriate. If it's to fill in the blanks, the answer is not only appropriate, but indicates a preference for mathematical, over language-based, thinking.

And that's only scratching the surface.

What about the answer: P A T P E T P I T P I G P I N, or P A T P E T P I T P A N P E N?

Who says we have to use all the vowels?

Unfortunately, a standard language or reading test calling for the initial solution would give a negative score to the

"legitimate" variations displayed above (and there are many more possibilities). It's not the content, but the expected referent, or output process which tends to confuse many unique learners.

If only we could remove the youngster's concern about HOW to do things, how to output them, they could concentrate on content. The issue is how clearly we structure the pattern by which we expect learers to respond. If we give them clear patterns, or if we allow for more than one appropriate answer, then there's room for problem-solving.

One of the greatest tragedies confronting unique learners is the lack of positive feedback for their strengths. They have usually accumulated a large supply of negatives for wrong answers and inappropriate behaviors. They work out of their weaknesses and can quote, chapter and verse, from long [internal] lists of failures. To complicate matters further, many of their strengths seem unrelated to school needs (i.e., sports, the arts, human relations, etc.). They are often grouped with similar students, although they may prefer independent work and long stretches of contemplation or isolation. They are given answers too soon, or presented with easier problems to solve, thus intensifying feelings of low self esteem and inadequate intellect.

In short, they are not trusted to carry out the serious [and joyful] business of learning. Most critically, they are not given credit for solid thinking, sometimes verging on the profound—usually, because their methods of attack and selections of strategy are so unique that they are overlooked by others.

The function of the problem-solving process is to identify their strengths and teach them to transfer those strengths to areas of learning and development that currently constitute their areas of failure. The demands on unique learners should not be reduced. Rather, our recognition of their capabilities must be increased.

REFERENCES

Dworkin, N. and Yehoash Dworkin. "Don't Say Anything, Just Hug Me," *Academic Therapy*, in press (Scheduled for Fall, 1982).

Dworkin, N., Dworking, Y., and Huhn, Ralph. "Teaching and Assessing Disabled Readers: A Strategies Approach," *Coming of Age, Vol. 3, The Best of ACLD*, 1982.

Dworkin, N. and Dworkin, Y. "The Legacy of Pygmalion in the Classroom," June 1979 *KAPPAN*.

Dwarkin, N., and Dawrkin, Y. "Academic and Behavioral Planning through an Alternative Model," *The Journal of Educational Thought*, Vol. 12, No. 1, April, 1978.

SHOULD TESTWISENESS CURRICULUM BE A PART OF UNDERGRADUTE TEACHER EDUCATION?

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The idea of teaching testwiseness to school-aged students and post-secondary students is certainly not innovative or earthshaking. Interest in this area has gained momentum over the last few years. In most situations the subjects of this interest have been the students. We are seeing more books and more chapters within reading and study skills books that have been written to teach students testwiseness strategies. Although some material has been directed toward the elementary child, more efforts have centered on the high school and college student.

What is Testwiseness?

The term "testwiseness" (TW) has meant many things to many people. A variety of interpretations and definitions has been associated with it. The following definition of testwiseness by Millman, Bishop, and Ebel (1965) will be used for purposes of this paper: "A subject's capacity to utilize the characteristics and formats of the test and/or the test taking situation to receive a high score." (p. 707)

This definition that TW is independent from the test-takers' knowledge of the content contained on the test itself. An immediate question that comes to mind would be whether or not one's mental or general ability has a relationship with TW. A review of the literature reveals that numerous studies have investigated this question.

Diamond and Evans (1972) studied the TW of selected sixth grade students and reported that no relationship exists between TW and general skill or ability. However, they did conclude that TW was unique to the cues or clues under study. This conclusion had also been previously substantiated by Dunn and Goldstein (1959) who found no relationship between TW and intelligence.

In a related study, Ayrer, Diamond, Fishman and Green (1976) did not find any relationship existing between TW and increased scores on the California Achievement Test among inner city students. For the most part, all correlations were low. Thus, this study does not support the Diamond and Evans research statement that "TW as a secondary cue response is quite specific to the particular clue or cue under investigation."

Testwiseness Strategies

When discussing TW, many references are made to the categorization of TW strategies as developed by Millman, Bishop and Ebel (1965). In their paper, two categories are presented: elements that are independent of the test constructor or test purpose and those that are dependent upon the constructor or purpose. The first category, often called general test-taking strategies, contains strategies for utilizing time efficiently, proofreading answers in order to avoid errors, learning how and when to make appropriate guesses, and using deductive reasoning in order to arrive at a correct answer. Included in the second category are strategies designed to consider the intent of the test constructor for using certain questions and for using cues found in the test when the answer is uncertain.

Gibb (1964) developed a strategy concerned with the problem of cues in test items and identified TW as a secondary cue response. His major premise was that students can be trained in TW and their performance would not be determined by knowledge of the subject matter.

The study by Diamond and Evans (1972) used fictitious material to elirninate content familiarity with naive sixth grade students, and investigated the correlations of TW. Diamond and Evans' strategy included the following five item faults selected for the study: association, specific determiners, correct alternatives, grammatical clues and overlapping distractors. With TW defined as a secondary cue response, the naive students appeared to have possessed it. However, data revealed that TW is not a general trait, but specific to the particular clue or cue being investigated. Therefore, the results were supportive of those of both Gibb (1964) and Dunn and Goldstein (1959).

Testwiseness Training

The practice of TW training has been widely investigated with the effects resulting in varying degrees of success. Giving emphasis on characterisics and format of the test rather than upon content or coaching for a specific exam, Wahlstrom Boersma (1968) concluded that ninth grade students receiving TW training had higher scores on criterion referenced tests. Oakland (1972) showed that disadvantaged preschool students having had TW training obtained a higher mean on the Metro-

politan Reading Readiness Test than those in the control group. However, when measured four months later, the results were not significantly different.

Callenbach's (1971) investigation reported that test-naive second graders who received TW training scored significantly higher on both an immediate and delayed standardized reading posttest than those students who received no training.

Not all researchers, however, found TW training to have positive effects. As cited earlier, Diamond et al. (1976) found no substantial relationship between the scores on the Vocabulary, Reading Comprehension or Language Usage subparts of the California Achievement Test of students given TW training and the control group. Yearby (1975) found that the TW skills of some third grade students were significantly increased by training but that this did not transfer to a significant degree on a standardized reading test. In addition, although Jongsma and Warshauer (1975) report that fifth grade inner city students who had studied a unit on TW skills averaged higher reading achievement scores than a control group, their gains were not significant.

Although research on TW has varied to a great extent in the aspects of measuring TW and the strategies used, some conclusions can nevertheless be drawn. First, TW is a bona fide entity and deserves attention. Second, TW is measurable. Third, TW appears to be made up of a set of specific skills rather than a collection of some general or wholistic abilities, and, fourth, TW training can be administered to students of all ages from early childhood to adulthood.

It would, therefore, seem that teachers at all levels need to be made aware of TW strategies and be able to train their students in acquiring these skills. This awareness could take place in teacher education programs, where preservice teachers could be trained to teach TW skills to their future students.

Pilot Study

Since we believe that some emphasis on the teacher as the subject of TW interest is called for, we developed this pilot study to begin looking at that area of teacher training. Because the need for the training of secondary education majors in TW is perhaps more obvious, we decided to do this pilot with elementary education majors. We feel that this pilot study might help give us *some* sense of the effectiveness of this training for preservice elementary teachers who will teach in a variety of grade and ability levels and in a variety of content areas.

The purpose of this investigation was to explore the research question: Will some training of undergraduate student teachers to teach TW strategies result in a signiicant degree of difference between the criterion referenced content area test scores of elementary children taught these TW strategies and the test scores of elementary children not taught these TW strategies?

Procedures

Just prior to their student teaching, and while completing a testing and measurement class, eleven elementary undergraduate majors received a module (Flippo) containing information and learning activities in TW strategies for objective tests appropriate for use with early childhod through college-level students, and a seminar class conducted by one of the researchers. This class covered an orientation to the use of the module and an explanation of the procedures to be used with the module, activities for teaching TW strategies to children, and information regarding the pilot study. Of the eleven student teachers received the TW training, eight of them have been included in this pilot.

Student teachers were assigned to second through sixth grade ability grouped classrooms in one of four elementary schools in northwest Mississippi. Students in these schools had been previously ability grouped by their reading scores on the California Achievement Test. In most cases, student teachers were assigned to classrooms with all high ability grouped children in a given grade in the same room or all average ability grouped children in a given grade in the same room. One student teacher had a more heterogeneous classroom assignment; however, there were not enough low ability children in that room to use low ability groups in this pilot study.

Students in the high ability and/or average ability groups in each class were randomly assigned at each of these ability levels into control and experimental groups. A total of 174 randomly assigned students in grades two through six were included in this study. Seventy-one of them were in experimental groups and one hundred and three of them were in control groups. The student teachers taught a unit in one of the social studies disciplines to the entire class of children over a period of about one month. Additionally, experimental groups were given TW instruction by their student teachers. The students in the control groups did not receive TW strategies training but instead were involved in regularly planned instructional activities within the units being studied.

Each day for a little over three weeks the student teachers worked through the 16 activities in their modules with the experimental groups of children. While the experimental groups worked on the TW activities with the student teachers in the classrooms, the children in the control groups worked on other activities like art, library work, etc., related to their social studies unit with the regular classroom teachers outside the classrooms. During this same time period, student teachers conducted whole class instruction in social studies units. The student teachers were cautioned not to include any TW information when teaching the social studies units. Likewise they were cautioned not to include any material from the social studies units in the TW activities with the experimental groups.

Each student teacher developed a criterion referenced test covering the social studies unit s/he taught for the purpose of measuring students' knowledge of the content taught in that unit. This test was developed according to the guidelines and instructions that the student teacher received in her/his testing and measurement class. It also included some not so obvious TW cues. All tests were submitted to the Division of Curriculum and Instruction at Delta State University and the researchers for evaluation of validity.

At the completion of the social studies units and treatment activities, each entire class in this study was given the social studies unit test developed by their student teacher. Only data from the tests which met a minimum quality of measurement were included in this study.

Statistical Analysis

An initial concern was the possible existence of significant disparity in TW between the experimental and control groups in each classroom prior to administration of the treatment. To check for pre-treatment variance, the classroom teachers of these groups were asked to rate the level of TW of each child in their class on a thirty point scale. A "Testwiseness Rating Scale" was developed specially for the study. Group ratings were then compared using a Mann-Whitney Test (Ryan, Joiner, & Ryan, 1976).

Of nine group comparisons made from the eight classrooms included in this study, none were significant at the .05 alpha level. Table 1 indicates median scores for the different groups and the subsequent p levels derived from administration of the Mann-Whitney Test. The findings indicated no signifiant difference in TW between experimental and control groups for any class prior to treatment.

To determine effectiveness of the treatment, the unit posttest scores for each instructional group were compared. The Mann-Whitney Test was used. Table 2 indicates median scores for the different groups and the subsequent p levels. The findings

indicate that the TW instruction was not a significant influence on unit posttest peformance.

Conclusions and Recommendations

Although there was not a significant difference between the experimental and control treatment groups for any of the units and for any of the grades and ability groups included in this pilot study, there was a slightly higher observed score for six of the nine experimental groups. This observed, but insignificant, difference certainly does not indicate that the student teachers were able to transfer the TW strategies instruction they received to the students they taught. However, it does indicate that a more tightly controlled study should be done to further explore the possibilties of TW training for student teachers and its transfer to their future students.

Many factors should be considered, such as the student teachers' mastery of the TW instruction they receive, the effects of several different approaches to the TW training of student teachers, the amount of TW training given to student teachers, and the effects of providing TW training to student teachers at different times or stages in their undegraduate education preparation.

While this pilot study did give us *some* sense of the effectiveness of TW training for preservice elementary teachers, it suffered because of the number of concomitant variables that were not controlled for. For instance, to what extent did the outside-the-classroom enrichment activities (i.e., art, library work, etc.) in the social studies units provide the control groups with more knowldge of or interest in the units, as compared to the benefits for the experimental groups receiving TW training? Or, to what extent did the newness or novelty of the student teachers teaching the TW effect the experimental groups' attentiveness? Did all of the student teachers give equal attention to the TW instruction of their experimental groups? These are but a few of the variables that should be controlled before another similar study is attempted. We think some TW training for preservice education students is a good idea; however, more positive documentation will be necessary before it can be thoroughly recommended.

Table 1
Pre-Treatment Ratings on Testwiseness

Group Comparison	Median Experimental	Median Control	p level
Second Grade-High Ability Transportation Unit	26.00	28.00	.0814 (NS)
Second Grade-Average Ability Transportation Unit	24.50	23.00	.6985 (NS)
Third Grade-High Ability Mississippi Unit	21.50	21.00	.8918 (NS)
Third Grade-High Ability Differences Are OK Unit	23.00	25.00	.2934 (NS)
Third Grade-High Abiity US Postal Service Unit	21.00	21.00	.6261 (NS)
Fourth Grade-High Ability Regions of the US Unit	22.00	21.00	.2727 (NS)
Fourth Grade-Average Ability Japan Unit	27.00	27.00	.9611 (NS)
Fifth Grade-High Ability Tooth Care Unit	23.50	21.00	.5669 (NS)
Sixth Grade-High Ability Mexico Unit	21.50	24.00	.0793 (NS)

Table 2
Comparison of Unit Posttest Scores by Group

Group Comparison	Median Experimental	Median Control	p level
Second Grade-High Ability Transportation Unit	100.00	100.00	1.000 (NS)
Second Grade-Average Ability Transportation Unit	97.50	92.50	.6985 (NS)
Third Grade-High Ability Mississippi Unit	94.00	82.00	.4025 (NS)
Third Grade-High Ability Differences Are OK Unit	82.00	79.00	.8182 (NS)
Third Grade-High Ability US Postal Service Unit	94.00	93.00	.8983 (NS)
Fourth Grade-High Ability Regions of the US Unit	99.00	98.50	.8625 (NS)
Fourth Grade-Average Ability Japan Unit	100.00	100.00	1.000 (NS)
Fifth Grade-High Ability Tooth Care Unit	89.00	85.00	.1921 (NS)
Sixth Grade-High Ability Mexico Unit	85.50	88.50	.5934 (NS)

REFERENCES

Callenbach, C. A. *The effects of instruction and practice in nonsubstantive test-taking techniques upon the standardized reading test scores of selected second grade students.* Unpublished doctoral dissertation, Pennsylvania State University, 1971.

Crehan, K. D. Developmental aspects of test-wiseness. Paper presented at the annual meeting of the American Educational Research Association, New York, NY, 1977.

Diamond, J. J., Ayrer, J., Fishman, R. & Green, P. Are inner city children test-wise? *Journal of Educational Measurement,* Spring 1976, *14,* 39-45.

Diamond, J. J. & Evans, W. An investigation of the cognitive correlates of test-wiseness. *Journal of Educational Measurement,* Summer 1972, *9,* 145-150.

Dunn, T. F. & Goldstein, L. G. Test difficulty, validity, and reliability as functions of selected multiple-choice item construction principles. *Educational and Psychological Measurement,* 1959, *19,* 171-179.

Flippo, R. F. Objective testwiseness module for education students. From *Testwiseness.* Rehoboth, MA: Twin Oaks, under contract.

Gibb, B. G. *Test-wiseness as secondary cue response.* Unpublished doctoral dissertation, Stanford University, 1964.

Jongsma, E. A. & Warshauer, E. *The effects of instruction in test-taking skills upon student performance on standardized achievement tests.* Final Report. New Orleans: University of New Orleans, Department of Elementary and Secondary Education, 1975.

Millman, J., Bishop, C. & Ebel, R. An analysis of test-wiseness. *Educational and Psychological Measurement,* 1965, *25,* 707-726.

Oakland, T. The effects of test-wiseness materials on standardized test performance of preschool disadvantaged children. *Journal of School Psychology,* 1972, *10,* 355-360.

Ryan, T. A., Joiner, B. L., & Ryan, B. F. *Minitab student handbook.* North Scituate, MA: Doxbury Press, 1976.

Wahlstrom, M. & Boersma, F. The influence of test-wiseness upon achievement. *Educational and Psychological Measurement,* 1968, *24,* 413-416.

Yearby, M.E. *The effect of instruction in test-taking skills on the standardized reading test scores of white and black third grade children of high and low socioeconomic status.* Unpublished doctoral dissertation, Indiana University, 1975.

INVITED ADDRESS

READING IN THE DISCIPLINES: COMPREHENDING PROPOSITIONS

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General reading consists of the information and skills that are useful in the reading of everyday language, e.g., the language of comic books, newspapers, magazines, and romantic novels. Special reading embodies the information and skills that are useful in the reading of the language of the special fields of study. It is sometimes held that reading teachers, who teach general reading and often take it to be the only kind, are the only ones qualified to teach reading and that subject teachers, therefore, who also frequently regard general reading as the only kind, do not have a responsibility to teach the special reading relevant to their respective fields. My aim is to dispel this contention. I propose to do so by providing an overview of the place of reading in the theoretical disciplines and then by taking a look at the connection between teaching reading in a theoretical discipline and teaching the discipline's content.

A familiar scheme for analyzing the theoretical disciplines is Aristotle's. According to it any intellectual discipline—theoretical, productive, or practical—may be regarded as having four elements: an end (that which is attained within the discipline), a subject-matter (that which is investigated), a method (the way whereby the end is to be attained), and basic principles (the concepts and statements by which all other concepts and statements of the discipline are explainable). Different theoretical disciplines might have different sorts of subject-matters, methods, and basic principles; but all of them have ends of the same type, namely, knowledge. Thus, the subject-matter of mathematics is abstract, invariable, and universal, whereas that of ethics, though universal, is neither abstract nor invariable. The method and basic principles of mathematics may be described as deduction and as form and abstraction, whereas those of ethics may be described as inquiry and as excellence and the soul. However, the end of mathematics and that of ethics, albeit specifically different from each other, are both knowledge.

The elements of a theoretical discipline may be regarded, to some extent, from the standpoint of language. The end of such a discipline, which is typically a body of conclusions, consists of universal or, at least, highly general statements that are expressed. In some cases, for example, logic and physics, the media for setting forth the final statements of theoretical disciplines are often "artificial"; in other case, for example, history and aesthetics, the media are frequently "natural." Artificial or natural, however, they are linguistic; for they are, *inter alia*, subject to the rules of logic, meaning, and grammar. The subject-matter of a theoretical discipline, which may be concepts, events, things, or something else, always may be designated and discussed through a language. The method is constituted by directives, and these always may be presented by virtue of language. The concepts and statements making up the basic principles always are expressible linguistically.

The linguistic media whereby the elements of a field, theoretical or not, appear are tantamount to the language of the discipline. These media include (among other things) signs, formulas, and arguments. The signs (e.g., the terms of a language) are mainly for expressing the concepts and denoting the objects relevant to the field. The formulas, which consist of ordered signs, are primarily for presenting the statements pertinent to the field. And the arguments, consisting of ordered formulas, are largely for setting forth and defending claims within the language. Some of the signs, formulas, and arguments of a linguistic field may be original to the field. The original signs of an area are those whose meanings are determined, partially if not completely, by the area. The original formulas are those whose meanings come, to some extent, from the area. And the original arguments are those whose respective standards of acceptability lie, to a degree, within the area. Thus, the term "tort" is original to the language of law; the formula, "2+2=4," is original to the language of mathematics; and the ontological argument for the existence of God is original to philosophy. While a set of signs, formulas, and arguments might be original to a language, it might pertain to another language also. Indeed, it seems that some of the signs, formulas, and arguments of a linguistic field usually derive from another field. Philosophy is notorious for utilizing elements from everyday discourse and the languages of many other disciplines, including productive and practical, as well as theoretical, ones. The sciences long have borrowed from mathematics and from each other. And the language of everyday life is stocked occasionally with items from the languages of the sciences.

The languages of the theoretical disciplines have a distinctive difference from those of the productive and practical disciplines. The subject-matters, methods, and basic principles of the productive and practical disciplines, like those of the theoretical disciplines, may be designated and discussed through language, but their ends, unlike those of the theoretical disciplines, might not be identifiable with linguistic elements. The end of a productive discipline, which is a product (fine or utilitarian), might, as in the case of a poem, consist of matters that are linguistic, but it need not, as in the case of a pair of shoes. Similarly, the end of a practical discipline, which is action, might be matters of language, as when it is speech acts, but it

need not be, as when it is an activity for exercising the body. Perhaps it is because of their close tie to language that the theoretical disciplines often are spoken of as embodied in language, and maybe it is because of this tie they usually are identified by behaviorists with verbal behavior.

In any event, the linguistic aspect of the theoretical disciplines is clearly where reading has its place in them. A major way to learn the contents of the theoretical disciplines is to read about the disciplines, which means, more specifically, to read about their subject-matters, their ends, their methods, and their basic principles. This approach is appropriate whether students are to become merely acquainted with the theoretical disciplines or whether they are to become experts in them. Besides being an instrument whereby the theoretical disciplines may be learned, reading occupies another instrumental role in such disciplines. It is a major vehicle by which the practitioners of the theoretical disciplines carry on their work. It is the vehicle whereby current practitioners learn what their predecessors accomplished, and it is the vehicle by which current practitioners most often learn what each other is doing. Of these two roles, the former should be especially interesting to the subject teacher. If students are to learn the contents of the theoretical disciplines, they practically must be able to read the various languages of those disciplines; and if they are to be able to read these languages, they must learn them on their own or through the assistance of teachers versed in them, who are not reading teachers but teachers of the theoretical disciplines.

Because the language of a theoretical discipline is special to that discipline, the reading pertinent to learning the discipline's content is special, not general. It might be, of course, that some general reading will be helpful in reading about a theoretical discipline; for the language of the discipline might contain elements from everyday language. Nevertheless, the ordinary linguistic elements that might appear in a theoretical discipline's language will not make complete sense as components of that language until they are linked to the language's other components. Thus, while the language of history contains much that is derivative from common language, it is not just one part everyday language and one part technical language; rather, it is an intermixture of the common and the technical. If a theoretical discipline's language were merely one part everyday and one part technical, a teacher of the discipline might protest rightly that he is not responsible for teaching the general reading integral to his field. But because the language of any theoretical discipline is special even if it contains ordinary linguistic elements, not even the teacher of a subject whose language embodies common linguistic components can shift the total responsibility for teaching the general reading related to his field to the reading teacher. The latter does not have the information or the skills to relate any ordinary linguistic elements that might be involved in a theoretical discipline's language to the special context of that language.

According to the foregoing it follows that the teaching of reading the language of a theoretical discipline is distinguishable from teaching the discipline's content. It might be that a person can teach the content by relying solely upon speech or some other medium other than print. It might be that a teacher has students who are bright and motivated enough to learn on their own to read the discipline's language and, therefore, might not need to be taught to read the language while they are being taught the content. Because teaching the reading of a theoretical discipline's language is distinguishable from teaching the discipline's content, it might prompt someone to believe that students of the subject must be taught its language separately from their being taught its content. It would be a mistake to believe this, however. Not only can the language of a theoretical discipline be taught along with the content, but it has to be. We will attempt to justify this position by focusing upon the teaching of the cognitive content of the theoretical disciplines.

As already explained, the end of a theoretical discipline is knowledge, which means that to teach the discipline's content is, among other things, to teach the knowledge which has been attained in the discipline. In its standard sense knowledge is justified true belief, i.e., true belief grounded upon adequate evidence. The object of a true belief is a proposition, or a proposed state of affairs that is either true or false. If the proposition that one believes is false, then one's belief is false; if it is true, then one's belief is true. Knowledge, then, is justified belief in a true proposition; and to teach the knowledge attained in a theoretical discipline is to teach the propositions which have come to be known in the discipline. Teaching a proposition requires that the teacher communicates the proposition, and communicating it requires that the teacher presents an expression of it (his own or someone else's). A characteristic of teaching is that it is a communicative act, which implies that it embodies some language. And a characteristic of propositions in a theoretical discipline is that they are expressible. The medium through which a proposition is expressible is language, and the language through which the propositions known in a theoretical discipline are expressible is the language of that discipline. Accordingly, to teach the propositions known in a theoretical discipline is to communicate them through the discipline's language. It is obvious, then, that a person may teach the reading of the language of a theoretical discipline while teaching the propositions known in the discipline; for in teaching the propositions he also may teach the elements of the discipline's language by which the propositions are expressed.

With little reflection it should be further evident that a person can teach these linguistic elements *only* in conjunction with teaching the relevant propositions and other factors of the discipline. The linguistic structures for expressing propositions are formulas, of which sentences and equations are familiar examples. While reading formulas in some contexts might amount to nothing more than recognizing the symbols and the relations ordering them in the formulas, reading the formulas expressing the propositions known in a theoretical discipline involves two other matters. 1) The function of the formulas as formulas in the discipline's language is to express certain propositions. Hence, reading the formulas includes recognizing that they do express propositions and comprehending the propositions expressed. 2) The propositions expressed by the formulas are grounded on evidence. Consequently, the formulas, when read, must be connected with the formulas stating the evidence such that the latter formulas can be seen as stating evidence for the propositions. In other words, the formulas expressing the propositions must be read in the way that the formulas stating the conclusions of arguments are to be read.

While our contention that teaching the reading of an intellectual discipline's language must be in conjunction with teaching the discipline's contents is directed at teaching the propositions known in the discipline, it may be seen as applicable to teaching the other contents of the discipline, namely, its subject-matter, method, and basic principles. The subject-matter of an intellectual discipline is what the discipline's knowledge is about, and statements about the subject-matter are to be made in the discipline's language. The method of the discipline is the way whereby the discipline's end is to be attained, and statements about the method are to be made in the discipline's language. The basic principles of the discipline are the concepts and statements whereby all other concepts and statements of the discipline have to be understood, and statements about them are to be made in the discipline's language. Accordingly, the language of an intellectual discipline serves not only to communicate propositions known in the discipline but also to express statements about the discipline's subject-matter, method, and basic principles. If, therefore, a person is to teach the reading of the elements of an intellectual discipline's language

whereby statements about the discipline's subject-matter, method, and basic principles are made, he or she has to present the elements to the student so that they are seen as having the function which they do have and are understood further as expressing the statements which they are employed to make. Thus, teaching the reading of these linguistic components must go hand in glove with teaching the discipline's content.

In sum, we have tried to show that subject teachers have a responsibility to teach the special reading of their respective fields. In providing an overview of the place of reading in the intellectual disciplines, we maintained that reading the languages of such disciplines is a major vehicle for learning the disciplines. The point of this contention was that the students in the theoretical disciplines greatly need to be able to read the special languages of such disciplines. In examining the connection between teaching the reading of an intellectual discipline's language and teaching the content of the discipline, we insisted that teaching the reading must go along with teaching the content. The point here was that, because the subject teacher (not the reading teacher) is the one versed in the language along with its content. We are tempted to continue and expand our argument to include the productive and practical disciplines, but one should not always attempt to do what one is tempted to do.