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Emphasis on Adolescents and Young Adults

Effects of Teaching a Questioning Strategy
on Reading Comprehension of
Learning Disabled Adolescents

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COOPERATING AGENCIES

Were it not for the cooperation of many agencies in the public and private sector, the research efforts of The University of Kansas Institute for Research in Learning Disabilities could not be conducted. The Institute has maintained an on-going dialogue with participating school districts and agencies to give focus to the research questions and issues that we address as an Institute. We see this dialogue as a means of reducing the gap between research and practice. This communication also allows us to design procedures that: (a) protect the LD adolescent or young adult, (b) disrupt the on-going program as little as possible, and (c) provide appropriate research data.

The majority of our research to this time has been conducted in public school settings in both Kansas and Missouri. School districts in Kansas which have or currently are participating in various studies include: Unified School District USD 384, Blue Valley; USD 500, Kansas City, Kansas; USD 469, Lansing; USD 497, Lawrence; USD 453, Leavenworth; USD 233, Olathe; USD 305, Salina; USD 450, Shawnee Heights; USD 512, Shawnee Mission; USD 464, Tonganoxie; USD 202, Turner; and USD 501, Topeka. Studies are also being conducted in several school districts in Missouri, including Center School District, Kansas City, Missouri; the New School for Human Education, Kansas City, Missouri; the Kansas City, Missouri School District; the Raytown, Missouri School District; and the School District of St. Joseph, St. Joseph, Missouri. Other participating districts include: Delta County, Colorado School District; Montrose County, Colorado School District; Elkhart Community Schools, Elkhart, Indiana; and Beaverton School District, Beaverton, Oregon. Many Child Service Demonstration Centers throughout the country have also contributed to our efforts.

Agencies currently participating in research in the juvenile justice system are the Overland Park, Kansas Youth Diversion Project, and the Douglas, Johnson, Leavenworth, and Sedgwick County, Kansas Juvenile Courts. Other agencies which have participated in out-of-school studies are: Penn House and Achievement Place of Lawrence, Kansas; Kansas State Industrial Reformatory, Hutchinson, Kansas; the U. S. Military; and Job Corps. Numerous employers in the public and private sector have also aided us with studies in employment.

While the agencies mentioned above allowed us to contact individuals and support our efforts, the cooperation of those individuals--LD adolescents and young adults; parents; professionals in education, the criminal justice system, the business community, and the military--have provided the valuable data for our research. This information will assist us in our research endeavors that have the potential of yielding greatest payoff for interventions with the LD adolescent and young adult.

Abstract

In this study question-asking was identified as a subcomponent of problem-solving and was employed to train reading comprehension. Nine junior high learning disabled students received a Questioning Treatment and an equivalent Control Group received traditional reading training. The study followed a 2 (experimental and control) X 2 (high and low questioning frequency levels) factorial design. The results of this study confirmed the hypothesis that training a questioning strategy is an effective method to increase reading comprehension performance as measured by a formal reading test. Two hypotheses were not confirmed: there was no significant linear relationship between questioning frequency levels and reading comprehension performance, and no significant interaction occurred between training conditions and questioning frequency levels.

EFFECTS OF TEACHING A QUESTIONING STRATEGY ON READING
COMPREHENSION OF LEARNING DISABLED ADOLESCENTS

Alley (1972a; 1972b) has offered an interactional definition of learning disabilities within a cognitive framework. This definition is applicable to educational intervention with learning disabled adolescents. Alley stated: "A learning disorder occurs when an individual's progressive sequential development is distorted by cognitive delay(s) and/or dysfunction(s) related to both the individual and the environment which negatively affect the process-product of problem-solving" (1972b). Lerner (1976) noted that the primary focus of the learning disabled student's reading problem is reading comprehension.

In a model of problem-solving developed by Feldhusen, Houtz, and Ringenbach (1972), asking questions was viewed as a subcomponent of problem-solving. The model indicated a questioning process could be used to aid the learner in making appropriate discriminations needed for reading comprehension. Training in oral questioning strategies has been related to gains in ability to analyze printed material (Bereiter & Englemann, 1966; Helfelt & Lalik, 1976; Manzo, 1969). Questioning strategies have been applied successfully when facilitating the reading comprehension of educable mentally retarded junior high school students (Knapczyk & Livingston, 1974). In their study, a teacher-implemented prompting procedure was found effective for increasing student-initiated questioning. Increased reading comprehension was a concomitant result. A replication study, also with educable mentally retarded adolescents, supported these results (Rinke, 1975). No studies could be found employing questioning strategies to train learning disabled adolescents on reading comprehension.

The purpose of the present study was to determine the effectiveness of teaching a questioning strategy to junior high school learning disabled students to increase reading comprehension performance. The study followed a 2 (experimental and control) by 2 (high and low questioning frequencies) factorial design. Three research questions were posed: (a) would there be a difference in reading comprehension for Treatment and Control groups; (b) would there be a difference in reading comprehension performance for high and low questioning frequencies; and (c) would there be an interaction between groups and levels of questioning frequency.

Method

Subjects

Eighteen students enrolled in a junior high school learning disabilities program, grades 7 through 9, served as subjects. Students ranged in age from 12 to 16 years. All of them had achieved a Full Scale IQ score of 86 or higher on the WISC-R (Wechsler, 1974) and were performing one or more years below grade placement as measured by the Gates-MacGinitie Reading Tests (Gates & MacGinitie, 1965). Each student was assigned to either a Treatment or Control Condition based on pretest levels of questioning frequencies.

Setting

The Questioning Treatment was administered by the learning disabilities teacher in an area of the classroom away from other students. This area was routinely used for individual instruction and was not unique to the Treatment.

Materials and Instrumentation

Appropriate levels of the Breakthrough Series (Allyn & Bacon, 1969) were used as reading comprehension material for both Treatment and Control Groups throughout the study. Comprehension questions for each selection was provided by the series manual.

Two instruments were employed. The Questioning Response Instrument (QRI) was constructed by the authors to elicit questions from the students. The QRI consisted of a stimulus picture chosen from current magazines. Picture content was controlled by applying the Picture Potency Formula (Manzo & Legenza, 1975) which yielded a high potency scaled score of 38. The resulting picture represented a family Christmas scene. Interjudge reliability for student response frequencies was 100% between two raters, the teacher and an aide.

A median was computed for the QRI which yielded two groups of frequency scores: those above the median (High Group) and a second group below the median (Low Group). Nine students from the High group were assigned to either the Treatment or Control Condition by first randomizing them by name together with their respective scores. Students' names were drawn and each one assigned to Control or Treatment condition. The same procedure was followed with the nine students in the Low group.

The Comprehension Test from the Gates-MacGinitie Reading Tests Form D was employed as a measure of reading comprehension for statistical comparisons. Form D1 was administered as a pretest and was employed as the covariate to control for initial differences in reading comprehension performance between Treatment and Control Groups. Alternate Form D3 was administered as a posttest and was used as the dependent measure.

Each student was given the following oral instructions for the QRI: "I want to see how many questions you can ask me about a picture I'm going to show you. I want you to ask me as many questions as you can think of. You may look at the picture for two minutes to help you think of some questions. When I tell you to begin asking questions, you will have three minutes to ask all the questions you can. I won't be answering any of the questions because that would slow you down. I just want to see how many questions you can ask."

A wall clock with a second hand was used to time the two durations. The responses were recorded on cassette tapes and tallied by the teacher and a trained aide.

Procedure

Questioning Treatment Condition. The Questioning Treatment based on the ReQuest Procedure outlined by Manzo (1969) consisted of ten reading sessions and was followed in this order:

1. Both the student and teacher used copies of appropriate levels of the Breakthrough Series by Allyn and Bacon Publishers (1969).
2. The teacher and student read the first two or three paragraphs of the selection following these steps:
 - a. Student and teacher read silently the first sentence.
 - b. The student asked as many questions as s/he could pertaining to the first sentence.
 - c. The teacher answered each question.
 - d. The teacher asked the student's questions pertaining to the first sentence.
 - e. The student answered the questions, or explained why a question could not be answered. In the latter case, the teacher provided the answer.
3. When two or three paragraphs had been read, using the steps outlined above, the student was encouraged to think of a question to ask pertaining to the outcome of the story or selection. This question was written down. The student orally answered his own question after completing silent reading of the selection.
4. The student finished reading the selection independently and answered comprehension questions.

Provision was made for levels of questions. Four levels were used to assist the student's reading comprehension:

1. Decoding Examples: Why is there an "s" on the end of this word? or How would you pronounce the third word?
2. Literal Examples: What color was the car? or How many men were shot?
3. Inferential Example: What do you think will happen next?
4. Evaluative Examples: Do you think she should have told her friend about the dream? Why? or Do you think the author of this story believes in UFOs? Did this story convince you that UFOs are real?

Looking back through the text the student answered comprehension questions that had been taken from the Manual. Students were given the choice of writing answers or asking the teacher to write them.

Upon completion of the comprehension questions, students were told the accuracy of their performance as a part of the daily classroom procedure. They were required to correct inaccurate answers orally.

Control Condition. Control Group students read silently and answered comprehension questions from appropriate levels of Breakthrough during reading sessions. They also received knowledge of results and were required to correct orally inaccurate answers. Individual help was given as needed.

Three hypotheses were tested using an analysis of covariance. The level of significance was set at $\alpha = .05$ for all F tests. The dependent variable was the Comprehension Test, Form D3. Independent variables were the Questioning Treatment and the QRI levels. The covariate was the Reading Comprehension Test, Form D1.

Results

Statistical Analysis

The means and standard deviations for the Gates-MacGinitie pretest raw scores are presented in Table 1. Table 2 presents the means, adjusted means, and standard deviations for the Gates-MacGinitie posttest raw scores. The results of the F tests are summarized in Table 3. The Gates-MacGinitie pretest was significantly related to the posttest raw scores yielding a correlation of .648.

Insert Tables 1, 2, and 3 about here

A significant difference on the adjusted posttest means for the Treatment and Control Groups was demonstrated, $F(1, 13) = 14.82, p < .01$. No significant difference between the adjusted posttest means for the High and Low QRI groups was shown, $F(1, 13) = 0.03, p < .05$. There was no significant interaction between adjusted posttest mean scores for experimental conditions and QRI levels, $F(1, 13) = 0.05, p < .05$.

Discussion

Three conclusions can be drawn from the results of this study. First, the major result of this study demonstrates that teaching a reciprocal questioning strategy is an efficient method to increase reading comprehension performance among learning disabled adolescents. Two alternate conclusions can explain the larger gains of the Questioning Treatment Group: (a) the Questioning Treatment was a structured procedure which provided many opportunities for both prompting and modeling during each reading session; and (b) training in questioning strategies appears to enhance verbal thinking. The research design of this study would suggest that the second conclusion is more tenable.

During the treatment procedure, changes in students' verbal behavior, both in quantity and quality, were observed. Students appeared increasingly concerned with accuracy. After the treatment sessions, students would often ask, "Why did I miss that one?" and would look back through the text to correct the answers. Students in the Control group appeared reluctant to correct inaccurate answers that required rereading any portion of the text.

Students sought out questions to stump the teacher. They appeared to develop specific strategies or patterns of questioning: one student asked questions pertaining to grammatical knowledge, e.g., "What is the verb in this sentence?" or "Does this sentence have a subject? Where is it?" Another student would ask the teacher to close the book and spell a word the student considered difficult, e.g., ambulance; still another would ask the intentions of the characters, e.g., "Why do you think he was doing that?"

During the final Treatment sessions, most students were asking so many questions that it became difficult for the teacher to think of meaningful questions to ask. The students' questions became increasingly congruent with the teacher questions. With an increase in question frequency, there was an increase in rate of questions. Questioning training sessions in the early Treatment sessions averaged in duration from 15 to 20 minutes. By the end of the Questioning Treatment, the sessions had decreased to five to ten minutes.

A second conclusion relates to the reading comprehension performance between High and Low QRI groups. No simple linear relationship existed between the frequency of questions produced and reading comprehension. This conclusion is inconsistent with the findings of Knapczyk and Livingston (1974) and Rinke (1975). An explanation for this apparent inconsistency is that the QRI may have been of questionable validity when measuring questioning ability. This can be for either of two reasons. First, only one sample of questioning was

obtained. The mean of three samples may have been a better index of questioning ability. Second, the QRI was based on a picture task which may not be relevant to the reading task on this Comprehension Test.

A third conclusion relates to the interaction of the treatment and the students. Students who were able to produce greater numbers of questions had no significant advantage above the students in the lower frequency range. The validity of the QRI is also applicable here. The nature of the Questioning Treatment must also be considered. The Treatment was a dynamic interaction which afforded the student many opportunities to imitate the types of questions asked by the teacher. Since the term "type" implies content; the need to deliberately employ question-asking with specific task content may increase performance on that task. This conclusion supports the implications of the cognitive definition of learning disabilities provided by Alley (1972a; 1972b).

Educational Implications for Teachers

A questioning strategies procedure can be effectively and efficiently employed by teachers to increase reading comprehension of learning disabled adolescents. The procedure can be learned quickly and does not require an inordinate amount of teacher time.

The questioning strategies procedure used in this study is a structured method which provides a consistent approach to reading. This method places learning in a cognitive, interactive framework approximating a familiar personal and social problem-solving context. The interactive nature of the questioning strategies procedure allows the teacher to be responsive to the student's expressed need for information. The student can actively develop specific strategies as he constructs meaning by: (a) drawing from his or her own background of experience, (b) noting unique characteristics of the material, (c) identifying gaps of knowledge, and (d) transforming new information into relevant concepts for further application.

When students are effective in using the questioning strategy in a one-to-one situation, the strategy should be used in intimate group settings of two or more with regular class content materials (Alley, 1977; Alley & Deshler, 1979). This grouping procedure would approximate a regular classroom situation and facilitate transfer to the regular class. Teaching students to use questioning strategies would allow them a greater measure of independence when identifying and solving instructional content problems in the regular class.

Implications for Future Investigation

Future studies using secondary learning disabled students are needed to: (a) cross-validate the major conclusion; (b) determine the types of questions that contribute to specific learning outcomes; (c) establish questioning training techniques for use with the acquisition of basic skills in content area materials, e.g., mathematics, writing, and spelling; (d) develop questioning training techniques with groups to facilitate independence; and (e) establish the relationship of question-asking to the learning potentials of learning disabled students.

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Table 1
Means and Standard Deviations for the
Gates-MacGinitie Pretest Raw Scores

Group	n	Mean	SD
Experimental			
High	5	22.80	13.85
Low	4	21.00	11.92
Control			
High	5	25.25	11.87
Low	4	32.20	10.13
Total	18	25.56	

Table 2

Unadjusted Means, Adjusted Means, & Standard Deviations
for the Gates-MacGinitie Posttest Raw Scores

Group	n	M ^a	M ^b	SD
Experimental				
High	5	34.00	35.78	9.95
Low	4	32.00	34.95	6.48
Control				
High	4	27.00	27.20	8.60
Low	5	31.60	27.30	9.21

^aPosttest unadjusted mean scores

^bPosttest adjusted mean scores

Table 3
 Analysis of Variance and Covariance
 for Gates-MacGinitie Posttest Scores

Source	SS	df	MS	F
Groups	265.90	1	265.90	14.82*
QRI Levels	.59	1	.59	0.03
Groups X QRI Levels	.93	1	.93	0.05
<u>Gates-MacGinitie</u> Pretest (Covariate) $r = .648$	850.00	1	850.00	47.00*
Error	233.20	13	17.94	

*p < .01