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READING COMPREHENSION DEVELOPMENT AS VIEWED FROM THE STANDPOINT OF TEACHER QUESTIONING STRATEGIES.

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AN INVESTIGATION TO DEVELOP PRACTICAL AND ECONOMICAL MEANS FOR DESCRIBING READING COMPREHENSION SKILLS AND TO DETERMINE TEACHER STRATEGIES FOR DEVELOPING THESE COMPREHENSION SKILLS WAS CONDUCTED. THE "READING COMPREHENSION INVENTORY" WAS DEVELOPED FROM A SYNTHESIS OF ELEMENTS COMMONLY AGREED TO CONSTITUTE READING COMPREHENSION. THE INVENTORY INCLUDED RECOGNITION, RECALL, TRANSLATION, CONJECTURE, EXPLANATION, AND EVALUATION. THESE COMPONENTS WERE ADOPTED FROM A CLASSIFICATION SCHEME BY ASCHNER AND GALLAGHER. A PILOT STUDY INDICATED THAT THE INSTRUMENT COULD BE USED RELIABLY BY DIFFERENT JUDGES. FOUR MAJOR STRATEGY AREAS OF TEACHER QUESTIONING ABOUT READING CONTENT WERE IDENTIFIED--INCIDENCE OF QUESTION TYPES, INCIDENCE OF CONGRUENCE BETWEEN THE QUESTION AND RESPONSE, MANIPULATION OF THE INTERACTION SURROUNDING A SINGLE QUESTION, AND RELATING QUESTIONS TO ONE ANOTHER. A SAMPLE OF FOUR TEACHERS AND THEIR STUDENTS AT EACH OF THE GRADE LEVELS 2, 4, AND 6 WERE RANDOMLY SELECTED FROM A POPULATION OF 106 TEACHERS IN A PUBLIC SCHOOL SYSTEM IN TEXAS. EACH READING GROUP WAS OBSERVED. INTERACTIONS BETWEEN TEACHER AND PUPILS WERE TAPE RECORDED DURING A 3-DAY PERIOD. THE INCIDENCE OF QUESTION TYPES WAS ANALYZED. TABLES, CONCLUSIONS, IMPLICATIONS, AND REFERENCES ARE INCLUDED. (BK)

Reading Comprehension Development as Viewed from the Standpoint of Teacher Questioning Strategies

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Teachers are charged with the responsibility of assisting pupils to develop reading comprehension skills. Beyond the charge to do the job there appears to be a serious lack of agreement about (1) the exact nature of the reading comprehension skills to be developed as well as (2) the means for developing such skills. In an effort to consolidate some of the information surrounding these concerns the following study was initiated. It sought to do the following:

- Develop a practical and economical means for describing reading comprehension skills
- Determine teacher strategies that appear useful in developing the foregoing comprehension skills

Reading Comprehension Development - What is it?

Smith (4) states that "comprehension is just a big blanket term that covers a whole area of thought-getting processes in reading." Presumably, the extension of Smith's blanket concept suggests that teachers conceive of comprehension development as the development of literal comprehension skills. While no definitive evidence exists to support this contention, there appears to be an abundance of testimonial and observational data that indicates that teachers confine their primary efforts to the literal. Illustrative of such is the observation by Austin (2) that "a rather low cognitive level is sought by the silent checks and comprehension questions that are found in most classrooms." At this point one may raise the question that if reading comprehension is more than literal comprehension, how much more is it? Or more simply, what is reading comprehension?

An inspection of the current literature fails to indicate a single set of reading comprehension skills subscribed to by all but rather a myriad of conceptualizations. Obviously, the imprecise understandings of the basic thinking processes of which reading comprehension is a part makes precise descriptions impossible. The resulting condition enables anyone with a hunch the freedom to construct a set of reading comprehension skills. However, despite the diversities in terminologies and numbers of skills as listed by various thinkers there appears to be areas of basic agreement. From a synthesis of the common elements an instrument was developed and tested. The resulting instrument, known as the Reading Comprehension Inventory, was carefully tested upon verbal sequences between children and teachers as they discussed reading materials and found to be useful in describing a variety of reading comprehension skills - outcomes.

A description of the Reading Comprehension Inventory follows:

Reading Comprehension Inventory

Recognition - These questions call upon the students to utilize their literal comprehension skills in the task of locating information from reading context. Frequently, such questions are employed in the guided reading portion of a story, i.e. Find the sentence that tells how the dog escaped?

Recall - Recall questions call for students to demonstrate comprehension by the recall of materials previously read. Such activity is primarily concerned with the retrieval of small pieces of factual material although the activity can vary greatly in difficulty. Recall like recognition, represents a literal comprehension task. An example of a recall question would be the following where the answer to the question is clearly printed in the text, i.e. What color was Jack's car?

Translation - Translation questions require the student to render an objective, part for part rendering of a communication. As such the behavior is characterized by literal understandings in that the translator does not have to discover intricate relationships, implications, or subtle meanings. Translation questions frequently call upon students to change words, ideas, and pictures into different symbolic form as is illustrated in the following material from Bloom. (3)

> Translation from one level of abstraction to another, i.e. abstract to concrete, lengthy to brief communication, etc.
>
> Translation from one symbolic form to another, or vice versa, i.e. pictures to verbal descriptions, verbal descriptions to dramatizations.
>
> Translation from one verbal form to another, i.e. non-literal statements (metaphor, symbolism, exaggeration) to ordinary English.

Conjecture - These questions call for a "cognitive leap" on the part of the student as to what will happen or what might happen. As such, the conjecture is an anticipatory thought and not a rationale, i.e. Do you think he will win the race? (answer not known at time of question and response.)

Explanation - Explanation questions call upon the students to provide a rationale such as the "why" or "how" of a situation. The rationale must be inferred by the student from the context developed or go beyond it if the situation is data poor in terms of providing a rationale. Examples or explanatory responses are: substantiations of claims, i.e. Explain why you think John was the best?; explanations of value positions, i.e. Why do you think this is the best story we have read?; conclusions, i.e. What can you conclude as the reason for Bill's failure?; main idea of this story?; and others.

Evaluation - Evaluation questions deal with matters of value rather than matters of fact or inference and are thus characterized by their judgmental quality (worth, acceptability, probability, etc.) The following components of this category are adapted from a classification scheme by Aschner and Gallagher. (1)

Questions call for a rating (good, bad, true, etc.) on some item (idea, person, etc.) in terms of some scale of values provided by the teacher.

Questions call for a value judgment on a dimension set up by the teacher. Generally, these are "yes" or "no" responses following questions such as "Would you have liked Tom for a brother?"

Questions that develop from conjectural questions when the questions are qualified by probability statements such as "most likely."

Questions that present the pupil with a choice of two or more alternatives and require a choice, i.e. "Who did the better job in your opinion, Mary or Susan?"

It was presumed that the instrument possessed face validity after it was tested against the various other conceptualizations of reading comprehension and found to be inclusive of their basic concepts. Pilot study testing of the instrument proved that it could be used reliably by two different judges. Table I indicates the frequencies and percentages of agreements by two judges on 206 questions.

TABLE 1

FREQUENCIES AND PERCENTAGES OF AGREEMENTS AND DISAGREEMENTS OF TWO JUDGES ON 206 QUESTIONS

Category	Agree	Disagree	Total	Per Cent Agree	Per Cent Disagree
Recognition	27	3		90.0	10.0
Recall	121	8		93.8	6.2
Translator	3	0		100.0	0.0
Conjecture	7	3		70.0	30.0
Explanation	8	2		80.0	20.0
Evaluation	30	3		90.9	9.1

Strategies for Reading Comprehension Development

If it is agreed that the foregoing reading comprehension skills descriptions are desirable reading comprehension goals, it must be determined how they may be achieved. Conceivably, one of the most important stimulants to the development of these varied skills lies within the context of the teacher's verbal questioning. Observation indicates that elementary school teachers tend to use many questions when working with students in reading groups. Probably this technique permits them extensive sampling opportunities that are not always possible in the written form. In any event it appears apparent that teacher questions are of vital importance in the task of developing reading comprehension skills. For this reason the study was focused upon teacher questions in an effort to describe the elements of strategy that appeared conducive to reading comprehension development.

Four major strategy areas of teacher questioning about reading content were identified. They were: incidence of question types, incidence of congruence or reciprocity between the question asked and the response offered, the manipulation of the interaction surrounding a single question, and the relating of questions to one another.

From a population of 106 second, fourth, and sixth grade teachers in a public school system in Texas, a sample of four teachers (and their respective students) at each of these grade levels was randomly selected for the study. The mean class size of the three grades was as follows: second grade, 29.7; fourth grade, 24.7; and sixth grade, 28.5. Three-reading-group structures were operant in all of the second and fourth grade classrooms while such a functional structure was found in only one of the sixth grade classrooms. Each reading group in the twelve classrooms was observed and recorded over a three day period (an average of approximately five hours per classroom). The taped recordings were subsequently transcribed to written protocols and analyzed in accordance with the research instruments.

Incidence of Question Types

The most apparent strategy decision of the teacher appears to be present in terms of the priorities he gives to question types. For example, if the teacher questions entirely in the recognition and recall area it is apparent that he feels that these are the most important reading comprehension skills for his group. Thus, if one samples from a large pool of teacher questions he can obtain a profile of the relative emphasis of the various question types in the teachers program.

In Table II a group pattern has been determined for a representative sample of second, fourth, and sixth grade teachers in a Texas school system. The pattern represents the results of three days observation in four classrooms at each of the three grade levels.

TABLE II

FREQUENCIES AND PERCENTAGES OF SIX QUESTION TYPES IN GRADES TWO, FOUR, AND SIX

Grade	Recog.		Recall		Transl.		Conjec.		Explan.		Evalua.		Total	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%
Two	108	12.3	584	66.5	2	.2	50	5.7	33	3.8	101	11.5	878	100
Four	118	16.3	351	48.4	4	.6	50	6.9	54	7.4	148	20.4	725	100
Six	26	10.2	121	47.6	6	2.4	20	7.9	46	8.1	35	13.8	254	100
Total	252	13.5	1056	56.9	12	.6	120	6.5	133	7.2	284	15.3	1857	100

Questioning strategies of the three grade level teachers in Table II present several notable contrasts. Initially, it is apparent from the frequency totals that second and fourth grade teachers ask many more questions than do their sixth grade counterparts. Second, it is noted that second grade teachers spend a significantly higher percentage of their questions upon the literal elements of recognition and recall (combined percentage of 78.8) as compared with the fourth and sixth grade teachers (64.7 and 57.8 per cent respectively). Conversely, the fourth and sixth grade teachers had a much heavier outlay of questions in the inferential areas of conjecture and explanation.

An explanation of the emphasis upon different questioning strategies above might rest in the old adage that states that "pupils learn to read in the primary grades and read to learn in the intermediate grades." Thus, the second grade teachers appeared to be testing the pupil's ability to literally understand selections while the upper grade teachers spent more questions in an effort to give students' experiences with higher level reading-thinking skills.

A notable difference indicated by Table II is the heavy use of evaluation questions by the fourth grade teachers. Close inspection of these questions indicated that they were judgmental questions which called for a "yes" or "no" response with regard to a question such as whether they liked the story or a story character. No immediate explanation of this phenomenon appears. It would be interesting to see if this pattern emerges consistently in subsequent studies or whether it might be conditioned by a single teacher.

Apparently the teacher questioning strategy of translation is virtually non-existent as evidenced by the small frequencies of such questions in Table II. The absence of questions in the area causes one to wonder about the measurement of the understanding of total stories.

In summary it appears that teachers in all three grade levels place the greatest emphasis upon the literal aspects of reading comprehension with the second grade teachers putting greatest emphasis upon this area. Fourth and sixth grade teachers give greater weight to the inferential aspects of comprehension with the fourth grade teachers giving special attention to permitting students to make value judgments.

Incidence of Congruence Between Questions and Responses

The most valid measure of a question's success seems to be whether or not the student can handle it successfully, (satisfy the substantive intent of the question). Thus, it is possible to view the types of questions that teachers ask and then see to what extent these various question types are met by congruent responses. In order to make a judgment about the congruence between a question and a response it is necessary to examine the question in relationship to its referent to determine the intent and then to examine the relationship between the response and the intent.

Table III reveals the incidence of total congruence in each of the three grades as well as the congruence of each question type. With the exception of the translation area which had wide discrepancies but minute frequencies the great congruence differences between the three grades rests in the recall area. Congruence appeared to diminish in accordance with ascending grade level (second, 92.5; fourth, 88.1; and sixth, 84.4).

TABLE III

FREQUENCIES AND PERCENTAGES OF QUESTION-RESPONSE CONGRUENCE IN GRADES TWO, FOUR, AND SIX

Grade	Recog.		Recall		Transl.		Conjec.		Explan.		Total	
	f	%	f	%	f	%	f	%	f	%	f	%
Two	35	94.6	520	92.5	1	100.0	39	95.1	20	80.0	615	92.3
Four	57	91.5	297	88.1	1	50.0	43	91.5	43	86.0	441	88.6
Six	16	100.0	76	84.4	4	80.0	16	100.0	37	88.1	149	88.2
Total	108	93.9	893	90.3	6	75.0	98	94.2	100	85.5	1205	90.4

In seeking an explanation for the decreasing congruence in the higher grades it was discovered that the upper grade teachers were more prone to accept an incongruent response as congruent than were the second grade teachers. The reason for this seemed to be explained by the reading materials and the questioning strategies of the teachers. Because second

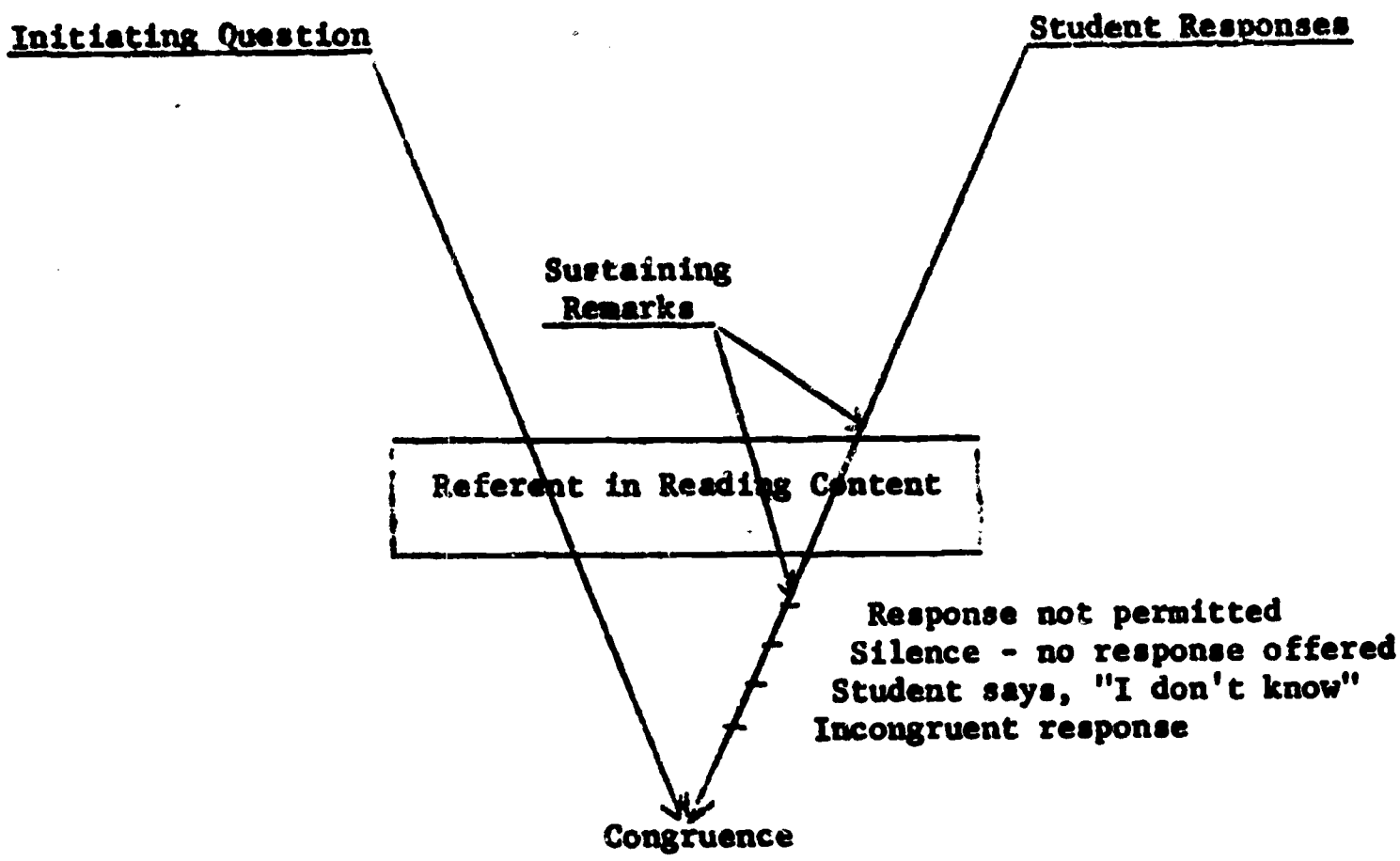
grade materials were composed of so few words the teachers were quite able to scan around and pick out factual pieces for questioning. Thus, they had a tight control over the content and were not prone to accept incongruent responses. On the other hand as the material in the fourth and sixth grades involved greater complications it was more difficult for these teachers to maintain a close check on the specific answers for which they were formulating questions. Consequently, when a student would give a piece of a correct response the teachers would frequently accept it even though it didn't really answer the substantive intent of their question.

By way of summary it was noted that congruence percentages for the three grade levels were very similar with the exception of the recall area where congruence declined in accordance with increasing grade level. The explanation for the decline appeared to be that all teachers were asking similar kinds of recall questions but that the upper grade teachers because of the increase of materials often lacked the answers to their own questions. Presumably such a finding indicates that upper grade teachers should know the specific answers or employ different types of questioning modes.

Interaction Surrounding a Single Question

Of probably greater importance than the congruence or incongruence of a question-response exchange is the interaction that takes place in such an exchange. At this point teacher strategies can become very evident. For example, one may see how a teacher handles a situation wherein several incongruent responses are offered. Does she give the students the answer? Does she offer further clues? Does she shift the question to still other students?

In order to describe the strategy elements involved in the single question the concept of the Question-Response Unit (QRU) was developed. The QRU represented the boundaries wherein the anatomy of an exchange could be illustrated. As such it contained the following elements: the teacher's initiating question; any subsequent remarks on the part of the teacher that might serve to extend, clarify, or cu subsequent student response; the referent in the reading materials for the question; the way in which the student subsequently dealt with the question; and finally the phase wherein attention was shifted away from the initiating question. Diagrammatically, the QRU is represented as follows:



Conceivably, every initiating question can be met by a congruent response on the first response attempt. However, such is not always the case as is illustrated in the diagram. In some instances the teacher may move the focus before a student can respond. In other instances, response time may be allowed but none may be forthcoming in which case the teacher may drop the unit or invoke a sustaining statement that will either clarify the question or offer some cues as to the correct response. These examples represent a very small number of alternatives that may happen in the context of a QRU.

In the study, a multitude of QRU patterns were identified. Because so many were seen only in a single instance or so the decision was made to focus upon those which occurred in at least three instances. Table IV represents a frequency report of such patterns. In order to understand Table IV it is necessary to study the following legend:

Symbols	Explanations
Q	This symbol represents the teacher's initiating question.
R	This capital "R" represents a student response.
/	The diagonal indicates a place wherein the teacher employed a clarifying, extending, or cueing remark. Such verbal actions hold the QRU open.

+ or - A plus indicates a congruent response while a minus indicates an incongruent one.

(-) This mark indicates a situation wherein a response was allowed but only silence was heard.

(0) This indicates that the teacher did not allow time for a student response.

A division line indicates separate responses.

TABLE IV

FREQUENCIES OF QUESTION-RESPONSE UNIT PATTERNS

Patterns	Recog.	Recall	Transl.	Conjec.	Explan.	Evalua.	Totals
QR+	74	681	4	56	50	189	1054
Q(0)/R+	5	34	0	1	4	2	46
QR-	4	41	0	0	1	0	46
QR-/R+	6	15	0	4	1	1	27
QR+/R+	0	5	0	3	3	4	15
QR+|R+	1	1	0	2	0	6	10
Q(-)	0	6	1	0	1	1	9
Q(-)/R+	0	5	0	0	0	0	5
Q(0)/(0)/R+	1	2	0	0	1	0	4
QR+|R-	0	4	0	0	0	0	4
Q(0)/R-/R+	1	2	0	0	0	0	3
Q(0)/(-)	1	1	0	0	1	0	3
Total	93	797	5	66	62	203	1226

It is obvious from Table IV that the question followed by a single congruent response (QR+) was the dominant pattern of interaction. Furthermore, observation indicates that the pattern tends to be closely associated

with "recall" questions. Because "recall" questions were most abundant in the second grade classes, the SR+ pattern was likewise most prominent in the second grade.

Interesting teacher questioning patterns were revealed by the following pattern types: QR+/R+, Q(-), and Q(0)/(0)/R+. The use of the QR+/R+ revealed initiating teacher questions that allowed for multiple responses, i.e. conjectural. Generally, as evidenced by the figures in Table IV this strategy of seeking several responses was not frequently used. The Q(-) indicated that a question was asked which caused a mass silence on the part of the students. Presumably, such a question might be a very complex thought question that stumped all concerned, and set the stage for further learning. However, such was not frequently the case these questions were generally recall questions over something that had escaped the readers. Finally, the Q(0)/(0)/R+ pattern signals a situation wherein the teacher has a problem in preparing verbal questions in proper form. This inability caused one study teacher to continually rephrase her questions. Unhappily, after the long discourse preceding the answering period it was discovered that students were frequently too confused to answer correctly. Presumably, a tape recorder would cue such a teacher to an awareness of a very real communication problem.

A second focus relative to teacher questioning strategies was the concept of the Question-Response Episode. The Question-Response Episode represented a combination of two or more Question-Response Units which tended to be related in the following ways:

Setting Purpose Follow-Up - This type of episode would result when a teacher would follow up a "setting purpose" question (S(0)) with a parallel question calling for a response. In other words, the teacher would ask the first question as a guide for the students and then would repeat the question in a manner that would call for response.

Verification - Verification episodes involve questions wherein congruence can be verified by referring to the text. As such, it is the reverse of the previous episodestype. In verification, episodes, the teacher follows up a student response with a question that calls for the verification or finding of the referent for the response to the previous question.

Justification - This type of episode appears when a teacher calls upon a student to justify his own or somebody else's previous response by the use of explanation. This explanation most frequently follows a judgmental or conjectural response to a previous question.

Judgmental - This episode type refers to situations wherein a teacher will ask for an evaluation of the student response to the preceding question. Thus, judgmental episodes constitute a reversal of the order employed in the justification episodes.

Of the 142 Question-Response Episodes tallied in Table V, 67 were "setting purpose follow-up" episodes. "Judgmental" episodes represented the least observed episode type as evidenced by six in this category.

TABLE V

FREQUENCIES OF QUESTION-RESPONSE EPISODES
IN GRADES TWO, FOUR, AND SIX

Grade	SP Follow-Up	Verification	Justification	Judgmental	Total
Two	26	11	11	3	51
Four	35	14	23	2	74
Six	6	8	2	1	17
Totals	67	33	36	6	142

Each episode represented in Table V included two Question-Response Units. Thus, the 142 Question-Response Episodes accounted for 284 of the 1857 total units identified in the study. Apparently, the teachers are not vitally aware of these four means of patterning questions into longer units.

Conclusions and Implications

Although the following conclusions and the implications based upon them are aimed specifically at the sample teachers it is the feeling of the researcher that these items may be keenly appropriate to a much wider group of teachers.

.. Conceivably, the expenditure of nearly 70 of a hundred questions in the literal comprehension areas may be justified. Unjustifiable, however, is the fact that most of these so-called literal comprehension questions involved the retrieval of the trivial factual makeup of stories. In real life reading situations, readers seldom approach reading with the purpose of trying to commit all the minute facts to memory. Rather, the reader is more interested in getting broad understandings of the material, finding out specific things commensurate with his interests of other needs, etc. It would appear then, that much of the recall questioning actually leads the students away from basic literal understandings of story plots, events, and sequences. It seems quite possible that students in these recall situations may miss the literal understanding of the broad text in their effort to satisfy the trivial fact questions of the teachers. Seemingly, if teachers want to get at utilitarian aspects of literal understanding they would offer many situations (rather than the few evidenced) for translational activities wherein they could

really determine the extent to which children were understanding the literal elements. Of course, before teachers can employ more comprehensive questioning patterns they must be aware of such. Thus, reading series should clearly spell out their comprehension structures in such a way that classroom teachers can have some clear insights about their task in comprehension development.

2. Students invariably are sensitive to "what teachers want" and generally do a good job of supplying. This appears very evident with regard to questions about reading when one notes that over 90 per cent of all literal comprehension questions are met with congruent responses on the first student try. Presumably, the programmed learning buff would comment that this is the way it should be. However, the inspection of the makeup of the questions as indicated in the preceding discussion would prove the folly of such a notion. About the only thing that appears to be programmed into the students is the nearly flawless ability to anticipate the trivial nature of teachers' literal questions. As evidenced by the high congruence and immediate response, the students have learned quite well to parrot back an endless recollection of trivia. It would be interesting to measure the same students' understandings of the story line via a translational question. Seemingly, this discussion simply enhances the preceding discussion by suggesting that a lot of congruent responses can probably be a rather dangerous thing and that it might be much better teaching if the congruence ratios are lower and children are stimulated to think a little more deeply. They certainly can be - and at the literal level.

3. If educators want to condition students for irresponsible citizenship it seems quite appropriate to ask children for unsupported value statements. As indicated in the study this practice is very frequent in the reading circle wherein the teacher throws a bevy of value questions at the students and asks for no more than a simple "yes" or "no". Unless this is a rhetorical protocol it seems imperative that teachers pattern the all-important "why" questions after students take positions. Until such is the common practice, it seems that teachers will condition students to take value positions without the vital weighing of evidence that seems to separate the thinking individual from the mob. Perhaps the use of a tape recorder would indicate to teachers their patterning practices with regard to each potentially dangerous questioning practices.

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