DOCUMENT RESUME

ED 221 986 EC 150 054

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TITLE Identifying Children Who Use a Perseverative Text Processing Strategy. Technical Report #15.
INSTITUTION Columbia Univ., New York, N.Y. Research Inst. for the Study of Learning Disabilities.
SPONS AGENCY Office of Special Education and Rehabilitative Services (ED), Washington, DC.
PUB DATE 81
CONTRACT 300-77-0491
NOTE 89p.

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS Intermediate Grades; *Learning Disabilities; *Learning Processes; Paragraphs; *Reading Comprehension; *Recall (Psychology)
IDENTIFIERS *Perseveration

ABSTRACT

To identify children who use a perseverative text processing strategy and to examine the effects of this strategy on recall and comprehenson, 255 fifth and sixth graders were screened for large differences between regressed standard scores for inductively (main idea last) and deductively (main idea first) structured paragraphs. Sixteen Ss were matched with a comparison group who performed as well over all, but whose scores did not show such differences. The two groups completed four listening and reading tasks dealing with inductively and deductively styled paragraphs. Results showed that Ss whose screening scores had large differences performed on all tasks as if they were using perseverative strategies. Analyses of the timed tests indicated that these students were reading the entire text, not processing only the beginning information and omitting the rest. Recall task results indicated equal total recall by the two groups, but the comparison group used more of the signalling terms from the texts. The perseverative group scored low on the inductively structured items on the oral word finding task. (Author/CL)

RESEARCH INSTITUTE FOR THE STUDY OF LEARNING DISABILITIES
Teachers College, Columbia University

IDENTIFYING CHILDREN WHO USE A PERSEVERATIVE TEXT PROCESSING STRATEGY

Susan Kimmel and Walter H. MacGinitie

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1981

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Abstract

The purpose of this study was to identify children who employ a perseverative text processing strategy and to explore the effects of this strategy on recall and comprehension of text. It also attempted to show that some text structures are particularly difficult for this group to understand.

Sixteen of the 255 fifth and sixth graders screened exhibited large differences between their regressed standard scores for inductively (main idea last) and deductively (main idea first) structured paragraphs. They were matched with a comparison group of 16 children who performed as well overall, but whose scores did not show such differences. The two groups completed four listening and reading tasks dealing with inductively and deductively styled paragraphs.

The results showed that students whose screening scores had large differences performed on all tasks as if they were using perseverative strategies. Analyses of the timed tests indicated that these students were reading the entire text, not processing only the beginning information and omitting the rest. Recall task results indicated equal total recall by the two groups, but the comparison group used more of the signalling terms from the texts. The perseverative group scored low on the inductively structured items on the oral word finding task.

Paragraph styles confusing to students using perseverative strategies are commonly found in school texts. Once identified, children using such strategies can likely be taught to employ more evaluative, flexible strategies.

IDENTIFYING CHILDREN WHO USE A PERSEVERATIVE TEXT PROCESSING STRATEGY

Susan Kimmel and Walter E. MacGinitie

The reading comprehension process has been viewed in recent literature within a framework of hypothesis testing (Collins, Brown, & Larkin, 1980; Rubin, 1977). That is to say, in order to derive meaning from text the reader must construct tentative hypotheses for what the material will be about. The reader must go through an active process of evaluation and test various possible interpretations of the text. The reader must finally construct a plausible model that takes into account all of the details in the text. If a promising interpretation fails to account for some aspect of the text, one has the options of accepting the interpretation as adequate in spite of its flaws or rejecting it as inadequate and searching for other possible interpretations. Thus, a basic process in comprehension is testing plausible hypotheses and evaluating goodness of fit. A reader appears to comprehend a text when he or she is able to find a configuration of interpretations that offers a coherent account for all of the different aspects of the text. To the degree that a reader fails to find such a set of interpretations, the text will seem incomprehensible.

The model that a reader constructs for a text is based upon what has been termed "schemata" in the literature on information processing. A schema is an abstract description of a thing or an event. It characterizes the typical relationship among its components and

contains a slot for each component that can be instantiated (Pichert & Anderson, 1977). Schemata exist for generalized concepts that underlie objects, situations, and events. We say that a schema "accounts for" a situation whenever the situation can be interpreted as an instance of the schema (Rumelhart & Ortony, 1977). Interpreting a message, according to schema theory, involves a matching of information in the message to the slots in the schema. The information entered into the slots is said to be subsumed by the schema.

Pichert and Anderson (1977), for example, asked college students to take different perspectives on a story. One passage that the subjects were asked to read was a story about two boys who are playing hooky from school and decide to explore one of their homes. The subjects were all asked to read the same story, but one third of them were instructed to read the story from the perspective of a burglar, one third were instructed to read the story from the perspective of a prospective home buyer, and one third were given no special perspective. The authors proposed that a burglary would contain a loot subschema. Since the three bicycles and Dad's famous paintings mentioned in the story could be considered loot, the authors hypothesized that these items were likely to be entered into slots in the loot subschema and become part of the instantiated representation in memory for the story. On the other hand, the leaky roof mentioned in the passage cannot be subsumed by a loot subschema (or other subschemata related to burglary). The subjects' recalls in the study varied according to the original perspective taken. Subjects in each group noted and retained information that was most relevant to the perspective taken.

The general form of this theory of information processing is that high-level schemata provide the "ideational scaffolding" (Ausubel, 1963) for anchoring elements in text. Whether or not a detail will be sufficiently processed to be remembered (or reconstructed in recall) depends upon whether there is a niche for it in the structure. In line with this interpretation, the effects of perspective found by Pichert and Anderson were a result of different high-level schemata providing slots for the different kinds of information contained in the text.

The application of schema theory as a framework for recall of information in text has led to a consideration of the reading comprehension process from the same point of view. One view of the comprehension of text is that it is a top-down or conceptually-driven process (Adams & Collins, 1977; Anderson, Spiro, & Anderson, 1977; Ausubel, 1963). Rather than analyzing a text component by component, the reader formulates possible hypotheses for the meaning of the text and undergoes a process of accepting or rejecting those hypotheses. According to this view, reading is conceived of as a "psycholinguistic guessing game" (Goodman, 1976). The reader's expectations about the content of a text represent a form of preprocessing that should make subsequent analysis more efficient.

Another view of reading comprehension proposes that reading is a bottom-up process, one that is data driven (Gough, 1972; Bobrow & Norman, 1975). According to this view there is a series of processing stages, each corresponding to a level of linguistic analysis. The processing begins with an analysis of letter features, combines information to identify words, and constructs the meanings of combinations of words.

A third, interactionist, view of reading comprehension emphasizes that both top-down and bottom-up processes are necessary (Rumelhart, 1976). The reader obtains information from an analysis of the initial portions of the text and constructs hypotheses that guide further analysis. Often, even the initial analysis is guided by the reader's goal or by expectations based on the situational context (Kintsch, 1979).

Spiro (1979) has proposed that some poor readers develop a particular approach to the task of comprehension that over-emphasizes either top-down or bottom-up processes. He proposes that some readers tend to use more "knowledge-based" processes while others rely on more "text-based" processes. The top-down, or knowledge-based, reader relies too much on world knowledge and on hypotheses based upon earlier portions of the text. The bottom-up, or text-based, reader relies too much on details in the text and fails to use world knowledge to guide text processing and to provide a framework for constructing the meaning of the text.

There appears to be a number of children whose reading comprehension problems represent a particular type of overemphasis on top-down processing. In order to derive meaning from text, a good reader constructs tentative hypotheses about the meaning of the text that has been read and about the content yet to come. The hypotheses remain tentative until all of the related information has been accounted for. The reader then constructs a plausible model that takes into account all of the details in the text. One particular type of poor reader forms hypotheses but fails to evaluate and modify them appropriately on the

basis of subsequent text. Specifically, these readers tend to formulate at the outset an hypothesis about the meaning of the text, then hold on to that interpretation rigidly in spite of disconfirming information in the later text. Instead of testing this interpretation against all of the new information as they read, these readers remain so inflexible that they may misperceive details in the text, conforming them to the original interpretation rather than changing the interpretation.

It is the purpose of the present study to show that there is a group of children with a reading comprehension disability who can be characterized as perseverative in their reading comprehension strategy and to explore the effects of this on the comprehension and recall of texts. A second purpose is to show that certain organizational structures, or "formulas" frequently used in writing for children are very difficult for this group of readers to comprehend.

Through careful reading of a great many children's texts from grade levels 3 to 6, it became apparent that many of the passages were written in a kind of inductive style. That is, initial sentences are used to lead up to the main point of a paragraph; the main point itself may be stated at the end. Children who use perseverative text interpretation strategies would find these paragraphs difficult to comprehend. They are likely to use the initial sentences to make an interpretation about the meaning of the whole paragraph and thereby misunderstand the text completely. There are several types of inductive formulas. These types include:

(1) Negation--paragraphs in which a belief or idea is stated in

beginning of the paragraph and later said to be false.

(2) Analogy--paragraphs in which the topic--a thing, fact, or idea--is explained by comparing it with another thing, fact, or idea, the analog. There are two subtypes: Direct Analogies and Opposite Analogies. In a Direct Analogy, the similarity Between the topic and the analog is described. In an Opposite Analogy, a contrast between the topic and the analog is described. If the analog is mentioned first in the paragraph, the inflexible reader is likely to construct a meaning that focuses on the analog and omits or merely appends the topic.

(3) Examples-Topic (Explicit)--paragraphs in which instances of a topic are stated followed by a concluding statement of the topic that is supposed to tie the paragraph together.

(4) Examples-Topic (Implicit)--paragraphs in which instances of a general topic are given, but the unifying topic is not explicitly stated.

Examples of the four types of formulas follow:

Type (1): Negation

> Perhaps you have heard someone say that people live on Mars, that the planet is inhabited. You may have heard someone talk about men from Mars who were supposed to have come to earth in space ships called flying saucers. People have had such imaginative notions about traveling Martians off and on for centuries. As far as we know, there has never been any evidence to support such beliefs. (O'Donnell & Cooper, 1973, p. 43).

Type (2): Analogy

> When people overwork, they get very warm and perspire. This helps make the body cooler. Birds, however, don't perspire through their skins. Heat and water leave their bodies through their mouths and they breathe fast to get rid of heat. (Boning, 1976, Level E, Unit 4).

Type (3): Examples-Topic (Explicit)

> In a steamy forest, far on the other side of the world, huge elephants are pushing heavy logs. On top of the world dogs are running over deep snow, pulling loaded sleds behind them. And across far-off deserts camels sway, carrying folded tents and goods for trade. All over the world animals are moving loads for people. (Fay, Ross, & LaPray, 1978, p. 20).

Type (4): Examples-Topic (Implicit)

> Usually the bones of bird's wings are hollow. This gives the bones strength without weight. The surface of the wing is curved. The fact that the front edge of the wing is thicker than the rear edge also makes for easier flight. (Boning, 1976, Level D, Unit 2).

Deductively organized paragraph structures are also common in children's texts. These deductive structures appear to be much easier for children who use a perseverative text interpretation strategy (and perhaps for many good readers, too) to understand, for the reader's first hypothesis about the main point of the paragraph is more likely to be correct. Four such structures are reversed variants of the Examples-Topic formula.

(A) Topic-Examples--paragraphs in which a topic is introduced at the beginning of the paragraph and followed by examples of different types.

(B) Topic-Details--paragraphs in which a concept (e.g., object, place, person) is named at the beginning and followed by details that describe it.

(C) Whole-Part--paragraphs in which a whole object or idea is named at the beginning and followed by descriptions of its various parts.

(D) Statement-Reasons--paragraphs that begin with a statement of fact or idea and continue with sentences that give reasons or explanations to support the statement.

The following are examples of these deductive types of paragraph structures:

Type A: Topic-Examples

> Communities can be different in many ways. There are communities with many people in them. These are called cities. Some cities cover lots and lots of land. Other cities have little land. Most cities are built near an ocean or river. In some communities there are fewer pople. These communities may have farms around them. They are called towns. (Van Roekel & Kluwe, 1973, p. 12).

Type B: Topic-Details

> There is a strange little worm in South America called the railroad worm. This little animal looks as if it is divided into parts. A light is on each part. When we look at the worm at night, it looks like a number of lighted train windows. (Boning, 1976, Level D, Unit 3).

Type C: Whole-Part

> In any forest, there are hundreds and sometimes thousands of living things which are related to one another. There are plants, vines, herbs, mosses, shrubs, ferns, and mushrooms which grow in the forest. There are also hundreds of different kinds of animals. One can find birds, insects, reptiles, and mammals living in the forest. (O'Donnel & Cooper, 1973, p. 71).

Type D: Statement-Reasons

> There are many reasons why cattle stampede—a clap of thunder, the howl of a coyote, a flash of lightning, the firing of a six shooter, the sight of a buffalo. Once started, the blind, mad, terrible rush is a frightening thing to see. (Boning, 1976, Level D, Unit 4).

Poor readers who perseverate in applying an initial interpretation should have particular difficulty understanding passages that elicit one schema at the outset then subsequently require a change. Such passages ("inductively" structured paragraphs) are common in expository written materials for children. The present study identified children who have particular difficulty understanding such passages and studied their responses to other tasks designed to reveal or elucidate the use of a perseverative text interpretation strategy.

METHOD AND RESULTS

Pilot Study

A pilot study was conducted using 161 fifth and sixth grade subjects from a parochial school in a middle class suburban community outside New York City. The first phase consisted of group screening, using a measure that contained 48 short expository paragraphs drawn from published children's reading texts. There were 24 paragraphs written with a deductive organization and 24 written with an inductive organization. All of the variations in structure previously described were included. Each paragraph was followed by a multiple choice question asking about the main idea of the paragraph. The reliabilities of the deductively organized and inductively organized subtests were computed, and regressed standard scores were obtained for each student on each subtest. Twelve students who scored much higher on deductive paragraphs than inductive paragraphs (perseverative group) were matched with twelve students who performed about as well on the whole but showed no large difference based on paragraph structure (comparison group). These two groups of subjects were given three other tasks designed to discriminate between the use of perseverative and more flexible text interpretation strategies. These tasks will be described in a later section. There were significant differences in the performance of these two groups on all tasks, supporting the hypothesis that the children in the perseverative group consistently used an inflexible processing strategy in their attempts to comprehend text.

Group Screening

Subjects

Two hundred fifty-five subjects participated in the group screening. They were fifth and sixth grade children drawn from two elementary schools in a white, middle-income suburban community on Long Island. The only information available on a school-wide basis was assessment by the reading specialist who stated that the fifth and sixth grade students in both schools were reading, in general, on or above grade level. Reading instruction in these schools is centered around a basal reader approach, but various supplementary materials are used.

Materials

A screening instrument was developed to locate children who use perseverative processing strategies. The instrument consisted of 48 short expository passages, three to four sentences in length, drawn from published children's reading texts of approximately fourth-grade reading level. There were 24 paragraphs written in a deductive style and 24 paragraphs written in an inductive style, sequenced randomly with the restriction that no more than three of the same type might occur in sequence. The paragraphs included all of the variations in structure previously described (Negation, Analogy, Examples-Topic (Implicit and Explicit) for inductive paragraph structures and the four variants of Examples-Topic for deductive paragraph structures). Each paragraph was followed by a multiple-choice question that asked for the main idea of the paragraph. The question appeared on the page following the paragraph.

The instrument was based on the one used in the pilot study, with some items revised on the basis of an item analysis of the pilot study responses. This screening instrument is shown in Appendix A.

Procedure

The subjects were given the 48 paragraphs to read in their regular classroom groups. Directions were read to the children and two sample paragraphs and questions following them were discussed. The children were instructed not to look back once they finished reading each paragraph. They were also told to ask for assistance in reading any difficult words. The children proceeded at their own pace until all paragraphs and questions were completed.

Results

The Kuder-Richardson Formula 20 reliability of the subset of 24 deductive items was .794. The reliability of the subset of 24 inductive items was .827. The intercorrelation of the raw scores on the two subsets of items was .720. The number right on the inductive paragraphs and the number right on the deductive paragraphs were calculated for each student and converted to a regressed standard score. The 16 children with the largest difference score (many more errors on inductive paragraphs) were selected for further study.

Individual Assessment

Subjects

The children selected on the basis of large difference scores constituted the perseverative group. An equal number of children,

matched for total performance on the group screening test, constituted the comparison group. The 16 children selected for the comparison group were chosen from among those children whose regressed standard score for inductive paragraphs was similar to their regressed standard score for deductive paragraphs. Table 1 shows the subjects' scores on their most recent standardized reading test and their last report card mark in reading. Reading test scores were not available for five students. Each child selected for the comparison group had a regressed standard score on the inductive paragraphs that was as similar as possible to his or her regressed standard score on the deductive paragraphs. Thus, the comparison group had an overall reading ability on the test materials equal to that of the perseverative group, but did not show any tendency to have particular difficulty with inductively structured text.

When groups were matched solely on total score, perseverative group children tended, of course, to show better performance than comparison group children on deductively structured text. A subgroup of nine of the perseverative group children was therefore matched with nine of the comparison group children who performed similarly on deductively structured text. This was done to be certain that any difference in the performance of the two groups could not be attributed to the perseverative group children being simply better deductive readers than comparison group children.

Table 1

Stanine Scores for Perseverative and Comparison Group Subjects on the Metropolitan Achievement Test (Administered Fall 1980) and Report Card Mark in Reading (for Marking Period Ending February 1981)

Perseverative Group				Comparison Group			
Subject	MAT Score	Reading Grade		Subject	MAT Score	Reading Grade	
		Letter	Numerical Equivalent[a]			Letter	Numerical Equivalent[a]
1	5	C+	3	1	6	B+	6
2	5	B	5	2	5	B	5
3	8	A	8	3	-	A	8
4	5	C+	3	4	-	C	2
5	5	B	5	5	-	B	5
6	5	C	2	6	-	B	5
7	4	C+	3	7	8	B+	6
8	7	B	5	8	3	C+	3
9	5	B	5	9	4	C+	3
10	7	B+	6	10	5	B-	4
11	-	C	2	11	5	C	2
12	5	C	2	12	5	B	5
13	5	B	5	13	3	C	2
14	5	C+	3	14	6	C+	3
15	5	C	2	15	6	B	5
16	6	B	5	16	7	B+	6
Mean	5.5	B-	4.0		4.8	B-	4.3

[a]numbers assigned to letter grades as follows: A=8, A-=7, B+=6 B=5, B-=4, C+=3, C=2, C-=1.

Table 2

Regressed Standard Scores for Sixteen Perseverative Group Subjects and Sixteen Comparison Group Subjects Matched on Total Score

Subject Pair	Inductive Score		Deductive Score		Total Score	
	Persev.	Comp.	Persev.	Comp.	Persev.	Comp.
1	37.77	44.09	52.24	44.44	90.01	88.53
2	40.93	48.84	54.20	48.34	95.12	97.18
3	33.02	48.84	62.00	48.34	95.02	97.18
4	45.67	52.00	58.10	52.24	103.77	104.24
5	36.18	40.93	48.34	40.53	84.53	81.46
6	44.09	50.42	54.20	50.29	98.29	100.71
7	34.60	39.35	44.44	38.58	79.04	77.93
8	42.51	47.25	52.24	46.39	94.75	93.64
9	42.51	50.42	54.20	50.29	96.71	100.71
10	33.02	37.77	48.34	38.58	81.36	76.35
11	44.09	50.42	56.15	50.29	100.24	100.71
12	37.77	42.51	52.24	42.49	90.01	85.00
13	37.77	42.51	54.20	42.49	91.96	85.00
14	44.09	53.58	56.15	54.20	100.24	107.78
15	45.67	52.00	56.15	52.24	101.82	104.24
16	50.42	55.16	60.05	56.15	110.47	111.31
Mean	40.63	47.26	53.95	47.24	94.58	94.49
SD	5.07	5.35	4.44	5.52	8.32	10.85

Table 3

Regressed Standard Scores for Nine Perseverative Group Subjects and Nine Comparison Group Subjects Matched on Deductive Score

Subject Pair	Inductive Score Persev.	Comp.	Deductive Score Persev.	Comp.	Total Score Persev.	Comp.
1	34.60	47.25	44.44	46.39	79.04	93.67
2	33.02	48.84	48.34	48.34	81.36	97.18
3	36.18	48.84	48.34	48.34	84.53	97.18
4	42.51	52.00	52.24	52.24	94.75	104.24
5	37.77	52.00	52.24	52.24	90.01	104.24
6	37.77	50.42	52.24	50.29	90.01	100.71
7	37.77	50.42	54.20	50.29	91.96	100.71
8	42.51	53.58	54.20	54.20	96.71	107.78
9	44.09	55.16	54.20	56.15	98.29	111.31
Mean	38.47	50.95	51.16	50.94	89.63	101.89
SD	3.80	2.50	3.40	3.09	6.74	5.58

Materials and Procedure

Four tasks were used in the individual assessment of the subjects in the perseverative and comparison groups:

Task I. Twelve paragraphs were constructed with the intention of misleading readers who tend to perseverate in applying an initial unconfirmed text interpretation. Each paragraph was designed to evoke a plausible hypothesis at the beginning of the text and eventually made it clear that another interpretation was necessary. The paragraphs thus encouraged the reader to formulate a hypothesis at the outset and then required the reader to change that hypothesis in order to construct a reasonable interpretation for the entire paragraph. The following is an example of one of these twelve paragraphs:

> It was the first day of school. Teddy seemed a bit nervous. But Mom took him to school just the same. We were all pleased that Teddy was going. We knew it would do him alot of good to learn new things. It was important that Teddy be trained properly for the show next Spring. A prize at the dog show would make the whole family proud of Teddy. And this school was highly recommended.

The children were given the twelve paragraphs to read silently. To insure that the children read through the entire paragraph (i.e., to be sure that the children were using perseverative processing strategies, not simply reading the first sentence and ignoring the rest), they were asked to follow the lines with their finger. In addition, a reading time measure was taken on each paragraph for all subjects.

Each of the twleve paragraphs was followed by a multiple choice question that tested whether the incorrect interpretation that was encouraged in the beginning had been appropriately revised by the time the entire paragraph had been read. For example, the following question was asked after the paragraph above:

Where is Teddy going today?

a) to an elementary school

b) to a show

c) to a dog school

d) for a walk

This task was used in the pilot study and was revised for the present study. The complete task is shown in Appendix B.

Task 2. Each child was given eight additional inductive paragraphs (like those in the 48-item group screening instrument) to read silently. After each paragraph, the child was asked to tell the examiner all he or she could remember about the story. The recalls were recorded on a portable cassette player. This task was also used in the pilot study and revised for use in the present study. The paragraphs are shown in Appendix C.

Task 3. The subjects were given an adaptation of a "children's word-finding test" developed by Pajurkova, Orr, Rourke and Finlayson (1976). Pajurkova et. al. developed this test to discriminate between a group of nine- and ten-year-old learning disabled children and a normal comparison group. In the adaptation constructed for the purposes of this study, each word-finding item was a paragraph consisting of four sentences,

each describing a person or object that was always labeled by the nonsense word "grobnick." The child's task was to name the real word that could be substituted for the nonsense word. Twenty-four such paragraphs were constructed. Twelve of these items were written in an "inductive" version in which the most criterial attribute statement came last, and twelve were written in a "deductive" version in which the most criterial attribute statement came first. The paragraphs were randomly sequenced. The following is an example of an item written in an inductive version:

> Every school has grobnicks. You can learn from a grobnick. A grobnick can make you a better reader. A grobnick can give you homework.

The following is the same item written in a deductive version:

> A grobnick can give you homework. Every school has grobnicks. You can learn from a grobnick. A grobnick can make you a better reader.

In the actual task, which is shown in Appendix D, each item was included only in an inductive version or in a deductive version and in each item grobnick stood for a different person or object. The deductive versions were included to keep the children from establishing a strategy of rejecting the most likely first guess. This task was also used in the pilot study and was revised for the present study. The examiner read each of the paragraphs to the child. The child then told the examiner what he or she thought a grobnick was and the examiner recorded the responses.

Task 4. Each child was given eight additional paragraphs like those in the screening test to read. Four of the paragraphs were inductive and four were deductive. They are shown in Appendix E. Reading time was recorded separately for the group of four inductive paragraphs and for the group of four deductive paragraphs.

Each of the students in the perseverative group and each of the students in the comparison group was tested individually. Half of the children were given the items in each task in one order and half were given the items in the reverse order. Each of the students was given the four tasks, in the order in which the tasks were described above, in a single session that lasted about 45 minutes.

Results

In order to analyze any possible effect of the order in which the items were administered, two-way analyses of variance were performed on the scores on Task 1 and Task 3. As shown in Table 4, there was no significant main effect or interaction involving order, so orders were combined for all subsequent analyses.

Table 4

Analyses of Variance for Effect of Order

Source of Variation	Sum of Squares	df	Mean Square	F	p
Groups Matched on Total Score (16 Subjects per Group)--Task 1					
Group	105.13	1	105.13	21.56	<.001
Order	6.13	1	6.13	1.26	ns
Group x Order	10.13	1	10.13	2.08	ns
Error	136.50	28	4.88		
Total	257.88	31	8.32		
Groups Matched on Total Score (16 Subjects per Group)--Task 3					
Inductive Items					
Group	42.78	1	42.78	47.21	<.001
Order	0.78	1	0.78	0.86	ns
Group x Order	3.78	1	3.78	4.17	ns
Error	25.38	28	0.91		
Total	72.72	31	2.35		
Deductive Items					
Group	1.53	1	1.53	1.27	ns
Order	0.28	1	0.28	0.23	ns
Group x Order	1.53	1	1.53	1.27	ns
Error	33.86	28	1.21		
Total	37.22	31	1.20		

(continued)

Table 4 (continued)

Groups Matched on Deductive Score (9 Subjects per Group)--Task 1					
Group	60.63	1	60.63	11.76	<.01
Order	8.85	1	8.85	1.72	ns
Group x Order	12.05	1	12.05	2.34	ns
Error	72.22	14	5.16		
Total	146.50	17	8.62		
Groups Matched on Deductive Score (9 Subjects per Group)--Task 3					
Inductive Items					
Group	18.12	1	18.12	17.19	.001
Order	2.46	1	2.45	2.33	ns
Group x Order	1.24	1	1.24	1.17	ns
Error	14.75	14	1.05		
Total	34.50	17	2.03		
Deductive Items					
Group	5.45	1	5.45	5.96	<.05
Order	1.42	1	1.42	1.55	ns
Group x Order	.23	1	.23	.25	ns
Error	12.80	14	0.91		
Total	18.94	17	1.11		

The data for all four tasks were analyzed on the basis of two comparison groups. One set of comparisons was made between the 16 subjects in the perseverative group and the 16 subjects in the comparison group who had been matched on the basis of total performance on the group screening. Another set of comparisons was made between a subgroup of the perseverative group and a subgroup of the comparison group. These subjects, 9 from each group, were matched on deductive score on the group screening.

Mean scores for Task 1, the misleading passages, are shown in Table 5. Both for the groups matched on total score and for the groups matched on deductive score, the perseverative group scored significantly lower ($t(30) = 4.54$, $p < .001$ for groups matched on total score; $t(16) = 3.03$, $p < .01$ for groups matched on deductive score).

Table 5

Means and Standard Deviations of Scores for Perseverative and Comparison Groups on Misleading Paragraphs (Task 1)

	Groups Matched on Total Score (16 Subjects per Group)		Groups Matched on Deductive Score (9 Subjects per Group)	
	Mean	SD	Mean	SD
Perseverative Group	5.13	2.92	5.44	3.17
Comparison Group	8.75	1.29	8.89	1.27

Mean scores for Task 3, word-finding items, are shown in Table 6. A two-way analysis of variance was performed on these responses with Group as a between-subjects variable and type of item (inductive or deductive) as a within-subjects variable (See Table 7). The results indicated that perseverative group subjects again had relatively more difficulty with inductive items than deductive items.

Table 6

Means and Standard Deviations of Scores for Perseverative and Comparison Groups on Word Finding Task (Task 3)

Groups Matched on Total Score (16 Subjects per Group)

	Inductive Items		Deductive Items	
	Mean	SD	Mean	SD
Perseverative Group	8.94	1.06	10.56	.72
Comparison Group	11.25	.93	10.13	1.36

Groups Matched on Deductive Score (9 Subjects per Group)

	Inductive Items		Deductive Items	
	Mean	SD	Mean	SD
Perseverative Group	8.89	1.17	10.56	.73
Comparison Group	10.78	.97	9.56	1.13

Table 7

Two-Way Analyses of Variance for Scores on Word Finding Task (Task 3)

Source of Variation	Sum of Squares	df	Mean Square	F	p
Groups Matched on Total Score (16 Subjects per Group)					
Group	14.06	1	14.06	12.86	.001
Type	1.00	1	1.00	0.91	ns
Group x Type	30.25	1	30.25	27.66	<.001
Error	65.63	60	1.09		
Total	110.94	63			
Groups Matched on Deductive Score (9 Subjects per Group)					
Group	1.78	1	1.78	1.73	ns
Type	0.44	1	0.44	0.43	ns
Group x Type	18.78	1	18.78	18.27	<.001
Error	32.89	32	1.03		
Total	53.89	35			

Reading time was analyzed for Task 1 in order to determine if subjects in the perseverative group were reading the passages thoroughly. Reading time was recorded as children were doing Task 1 items. Mean scores for time taken to read all Task 1 passages are shown in Table 8. The reading times for the groups were almost identical, and the small differences were not statistically significant ($t(30) = .50$ for groups matched on total score; $t(16) = .16$ for groups matched on deductive score).

Table 8

Means and Standard Deviations of Time in Minutes to Read Twelve Misleading Paragraphs (Task 1)

	Groups Matched on Total Score (16 Subjects per Group)		Groups Matched on Deductive Score (9 Subjects per Group)	
	Mean	SD	Mean	SD
Perseverative Group	4.80	.31	4.81	.40
Comparison Group	4.86	.33	4.84	.29

Task 4, which consisted of four inductive paragraphs and four deductive paragraphs that subjects read silently, was timed in order to determine if subjects were spending different amounts of time reading inductive and deductive passages. Mean scores for time taken to read all four inductive paragraphs and all four deductive paragraphs are shown in Table 9.

Table 9

Means and Standard Deviations of Time in Minutes to Read Four Inductive and Four Deductive Passages (Task 4)

	Inductive Passages		Deductive Passages	
	Mean	SD	Mean	SD
Groups Matched on Total Score (16 Subjects per Group)				
Perseverative Group	1.76	.29	1.76	.25
Comparison Group	1.78	.38	1.54	.34
Groups Matched on Deductive Score (9 Subjects per Group)				
Perseverative Group	1.69	.28	1.75	.31
Comparison Group	1.77	.39	1.55	.43

Two-way analyses of variance were performed on the time taken to read the Task 4 paragraphs, with group as a between-subjects variable and type of paragraph (inductive or deductive) as a within-subjects variable (See Table 10). Although the means in Table 9 show that the comparison group read deductive passages somewhat more quickly, the analyses of variance indicate that there were no significant main effects or interactions.

Table 10

Two-Way Analyses of Variance of Time in Minutes to Read Eight Task 4 Passages

Source of Variation	Sum of Squares	df	Mean Square	F	p
Groups Matched on Total Score (16 Subjects per Group)					
Group	0.205	1	0.205	3.610	ns
Type	0.051	1	0.051	0.893	ns
Group x Type	0.196	1	0.196	3.452	ns
Error	3.403	60	0.057		
Total	3.854	63	0.061		
Groups Matched on Deductive Score (9 Subjects per Group)					
Group	0.113	1	0.113	1.810	ns
Type	0.005	1	0.005	0.086	ns
Group x Type	0.102	1	0.102	1.635	ns
Error	2.004	32	0.063		
Total	2.225	35	0.064		

The recalls of the Task 2 inductive passages were analyzed as follows. For each paragraph, a set of key words and ideas was listed that were judged to be clues to the structure of the paragraph. These words are listed for each paragraph in Appendix C. For example, in paragraphs based on a negation formula, key words would include any adversative (but, yet, still, etc.). Key words might also include a summary word indicative of the examples-topic formula. In a paragraph about things people find in a mailbox, for example, key words would include statements such as "many items," "different things," etc. Each students' recall of each paragraph was given a score based on the number of key words or ideas that occurred in the recall. The mean number of key words present in the recalls are shown in Table 11, as well as the total number of words in the recalls. Analyses of covariance were performed on the number of key words present in the recalls with the total number of words in the recall as covariate. The results indicated that comparison group subjects had significantly more key words in their recalls ($F(1,29) = 126.22$, $p < .001$, $MS_e = 5.32$ for groups matched on total score; $F(1,15) = 97.60$, $p < .001$, $MS_e = 5.20$ for groups matched on deductive score).

In addition, the number of words referring to the content in the first part of the paragraph (i.e., before there was a structural signal to the change in topic) was calculated for each recall. (See Appendix C for the list of content words). This was done in order to verify that the recalls of perseverative group subjects were good-faith efforts related to the content in the paragraph. The mean numbers of content words present in all of the recalls are presented in Table 11. Analyses of covariance were performed on the number of words referring to the content of the first part of the paragraph with total number of

words in the recall as the covariate. The results indicated that there was no significant difference between the groups ($F(1,29) = 1.24$, $MS_e = 7.47$ for groups matched on total score; $F(1,15) = 1.00$, $MS_e = 5.27$ for groups matched on deductive score).

To be certain that the recall analysis was reliable, an inter-rater reliability was determined both for the analysis of key words and for the analysis of content words based on the first part of the paragraph. A percentage of agreement was obtained based on a second rater's check of the presence or absense of key words and content words in the recalls. The rater was given the list of possible key words and content words listed in Appendix C and was told to accept any appropriate variations in wording. The results indicated a .82 percent agreement on key words and a .87 percent agreement on content words.

Table 11

Means and Standard Deviations for Key Words, Content Words and Total Words in Recalls

	Key Words		Content Words		Total Words	
	Mean	SD	Mean	SD	Mean	SD
Groups Matched on Total Score (16 Subjects per Group)						
Perseverative Group	0.62	0.43	3.64	2.43	22.53	8.32
Comparison Group	2.07	0.36	3.28	2.86	25.26	6.13
Groups Matched on Deductive Score (9 Subjects per Group)						
Perseverative Group	0.61	0.52	3.45	1.96	23.12	6.17
Comparison Group	2.14	0.41	3.61	2.58	25.13	6.74

DISCUSSION

The group screening used in this study proved to be a reasonably reliable instrument for identifying children who tend to perseverate in their initial attempts to make sense of text. The task was easy to administer and appeared to be a pleasant and challenging task for the children who participated. The screening instrument contained paragraphs taken directly from children's reading texts. This provides supporting evidence for the fact that children who use such inefficient text processing strategies will have special difficulty coping with certain school reading tasks.

Based on recent report card marks and Metropolitan Achievement Test scores, the perseverative group subjects selected by the screening seem to be reading about as well as the comparison group subjects. These children appear to differ, however, in the way they process text information, and this difference is likely to hinder their academic performance as they proceed through school. Reading material written for children in junior high school and high school is likely to contain many variations in text structure. Children who tend to rely on perseverative processing strategies would likely encounter increasing difficulty as they read higher level reading materials with more varied and complex organizations. In addition, there is an increasing need in the higher grades to rely on information gained from reading. Therefore, such inefficient reading comprehension strategies would greatly effect what these children learn from school.

The results of this study support the hypothesis that there are readers who use a perseverative text interpretation strategy and that inductively structured text is more difficult for these readers to comprehend. The 16 children who had the largest difference scores on the screening test performed on all subsequent tasks as if they were consistently using such a strategy. The pattern of results was essentially identical when a subgroup of the perseverative group was compared with children matched on deductive score.

The results of Task 3, the word finding task, indicated that the use of perseverative text interpretation strategies goes beyond the reading process. The word finding task was read to the children, yet the perseverative group children performed relatively much better on deductive items than inductive items. Thus, it is possible that perseverative strategies that appear to be operating in text interpretation may also be guiding some children's processing of some types of oral language. During the administration of Task 3 it appeared to the examiner that several perseverative group children tended to listen to the first part of an inductive word finding item, acted as if they had come to a decision about what a "grobnick" was, and then did not really attempt to process the rest of the information. It seemed apparent that they had made an interpretation prematurely and neglected to revise it in line with incoming information.

Results of the reading time analyses indicated that children in the perseverative group do not simply read paragraphs so quickly that they read the beginning of the text and ignore the rest of the information. They must be processing the text in some superficial way but do not really integrate the information from different portions of

the text. Although the interaction between group and type of passage was not significant, the comparison group subjects did spend relatively more time reading inductive than deductive paragraphs. They may recognize intuitively that paragraph structures that lead up to a main point at the end require more careful reading.

The results of the recall task were informative. Children in the perseverative group recalled approximately the same number of words as did children in the comparison group, but their recalls were qualitatively different. Although both groups tended to recall about the same number of words referring to the content of the first part of the paragraph, comparison group subjects tended to include key words that cued the inductive structure of the paragraph. They tended to organize their recalls around these structural markers. The following is an example of a Task 2 paragraph that subjects were asked to recall:

> The tiger's coat is reddish tan on top. Underneath, it gets somewhat white. It is covered with black stripes. There is a plant with orange flowers and black stripes like the tiger's fur. This flower is called a tiger lily.

The following is an example of a comparison group subject's recall organized around the structural cue "there is."

> There's a flower that looks just like a tiger's fur. It is orange and has black stripes. The flower is called a tiger lily.

The perseverative group subjects, on the other hand, generally omitted the most important structural key words. The following is a perseverative

group subject's recall of the same paragraph in which the key words are omitted:

> The tiger has a reddish coat. It is tan on top. Under, it's white. It has black stripes all over it.

In addition, recalls were often elaborations of the child's initial misinterpretation of the main point of the paragraph. The following is another Task 2 paragraph that subjects were asked to recall:

> People have written stories about snakes crushing and squeezing their enemies into a pulp. Such stories about snakes crushing their enemies out of shape with a tremendous force are not true. Snakes just squeeze enough to stop their enemies from breathing.

The example that follows is a recall of this paragraph that is an elaboration of a perseverative group child's initial misinterpretation:

> Snakes crush and squeeze people to death. They squeeze them completely out of shape. They get crushed into a pulp. People write stories about snakes.

It is most important to consider that inductively structured texts, which frequently mislead children who use a perseverative text interpretation strategy, are commonly found in material that children are expected to read in school.

It seems likely that many students who use a perseverative text interpretation strategy might be taught to evaluate their initial hypotheses as they continue reading. One possible approach to such instruction

might be to give the child guided practice in recognizing the various inductive text organization "formulas" that give the student particular difficulty. Informal work with a few students suggests that some can readily learn to recognize and respond appropriately to Negation formulas that begin with "some people think that...," or some similar form. The students should be taught that some paragraphs save the main idea for the end, and that they should not make a decision about what a text is about until they have taken all of the information into account. They should be given practice in finding the main idea of various types of paragraph structures and learn to expect main idea information at various points in a text.

Another technique for developing a more flexible approach to the reading task might be to have children read stories from different points of view. Children would be asked, for example, to read Cinderella from the point of view of Cinderella and again from the point of view of the wicked stepmother. The children might then discuss how such differing points of view would effect what you understand and remember from a story.

Instruction and practice in using words with multiple meanings might help children who tend to use perseverative reading strategies develop a more flexible approach to the task of understanding text. They would be taught to access possible meanings for a word based on clues from the beginning of the sentence, and then confirm or reject these tentative hypotheses based on the rest of the sentence.

If children with a perseverative text interpretation strategy can learn more flexible reading strategies, the work reported here has

considerable promise, for a screening instrument for locating such children is now available. While the instrument has only modest reliability at present, it can readily be lengthened and can be refined on the basis of current item data. One possibility that needs to be explored is that the various inductive formulas define distinct subtests within the screening instrument; it is possible that some children with a perseverative text interpretation strategy find one or more of the formulas particularly difficult relative to the others. It is also quite plausible that children identified by the screening instrument are not a uniform group. It is likely that the same result on the screening could stem from a variety of specific unproductive strategies.

While the perseverative group did significantly worse than the comparison group on both the misleading passages and the "inductive" word-finding items, there was considerable variability within the perseverative group. One question that needs further exploration is the range of tasks to which particular children apply a perseverative strategy. This investigation suggests that at least some of the children in the perseverative group apply the perseverative strategy when they listen to written language that is read to them, as demonstrated in the results of the word-finding task. Some of the children may extend the perseverative strategy to problem solving in other domains. The nature of the perseverative strategy itself needs further exploration leading to a better theory of this type of behavior.

It is important to realize as well, that there were also some children who did relatively well on the inductively structured paragraphs

of the screening instrument. The reading strategies of these children have not yet been studied. Evidently they are children who reserve judgment and are able to remember and keep tentative their possible interpretations until they are able to construct a model of the entire paragraph that best fits some particular set of possible interpretations. Again the range of tasks to which they might extend this strategy is an important question.

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Appendix A

GROUP SCREENING: DIRECTIONS AND ITEMS

Directions:

Read each paragraph very carefully. If you have trouble reading any of the words, please raise your hand. After reading each paragraph turn the page and put an X in the box with the best statement of the main idea. Please don't look back at the paragraph once you have turned the page. Take your time and raise your hand if you want me to help you.

Sample 1

Fish do not all sleep in the same position. Some burrow into the sand, buried right up to the mouth. The trigger fish lies down on its side. Others sleep suspended in mid-water. Some fish sleep standing on their tails. One fish sleeps standing on its head.

Sample 1

The main idea of the paragraph is:

( ) Some fish sleep standing on their tails.

( ) Fish do not all sleep the same way.

( ) The triggerfish sleeps on its side.

( ) One fish sleeps on its head.

Sample 2

People say that moths eat clothes. This isn't true. Moths can't eat clothes. They don't have the right type of mouth. It is the caterpillar that destroys clothes. When the caterpillar becomes a moth, it no longer eats clothes.

Sample 2

The main idea of the paragraph is:

( ) A caterpillar becomes a moth.

( ) Moths eat clothing.

( ) Caterpillars eat clothing.

( ) When a caterpillar becomes a moth, it can't eat clothes.

1

Some tigers live only where it's warm. Siberian tigers come from cold pine forests. In winter their fur is very long and thick. These tigers are larger than the kinds of tigers that live in warmer places. They need more food in cold weather.

1

The main idea of this paragraph is:

( ) Tigers like to live where it's warm.

( ) Siberian tigers have long, thick fur.

( ) Siberian tigers need more food in cold weather.

( ) Some tigers can live in cold climates.

2

An elephant uses its trunk to do many jobs. With its trunk it can smell, feel, and pick things up. Its trunk is strong enough to uproot a tree and gentle enough to brush a fly off its trainer. And when an elephant wants a shower, it just fills its trunk with water and sprays itself.

2

The main idea of this paragraph is:

( ) An elephant's trunk can uproot a tree.

( ) An elephant can do many things with its trunk.

( ) An elephant can give itself a shower.

( ) An elephant can pick things up with its trunk.

3

Birds are animals that have feathers and wings. We see them overhead and resting in trees. However, not all birds can fly. The largest bird in the world, the ostrich, is one of these non-flying birds. It has strong legs that help it run very fast to escape from its enemies.

3

The main idea of this paragraph is:

( ) Birds are animals that have wings and feathers.

( ) The ostrich is the largest bird in the world.

( ) Not all birds are able to fly.

( ) Birds often rest in trees.

4

The kangaroo of Australia is perhaps the best-known jumper of the animal world. The great gray kangaroo measures from seven to eight feet in height and often weighs more than 200 pounds. It seems strange that such a big, heavy animal should travel about over the ground in leaps of ten to fifteen feet. When he really feels like traveling, he can leap twice that distance. His heavy tail balances him as he shoots through the air.

4

The main idea of this paragraph is:

( ) The Australian kangaroo is the best-known jumper in the world.

( ) The kangaroo of Australia is very big and heavy.

( ) The Australian kangaroo can jump ten feet in the air.

( ) The kangaroo's tail balances him as he jumps.

5

When we think of leaves, we think of the leaves that are on maple or oak trees and others like them. There are leaves, however, that are not broad and flat. Some leaves are pointed and narrow. The needles from the pine trees are leaves. They aren't flat.

5

The main idea of this paragraph is:

( ) Leaves are broad and flat.

( ) Some leaves are pointed and narrow.

( ) Pine trees have needles.

( ) Maple and oak trees have leaves.

6

Radio was a great advance in communication. Few inventions have brought such changes into the American home. Before radio came, few people had ever heard the voice of the President of the United States. Few had ever heard an opera or a symphony. All the news came from newspapers. Anything that happened after midnight was not known in the home until the next afternoon.

6

The main idea of this paragraph is:

( ) Few people ever heard an opera before radio.

( ) Before radio, few people had ever heard the President speak.

( ) Radio brought great changes in communication.

( ) All news came from newspapers before radio.

7

The bald eagle is known to make very large nests. One nest found in Ohio was twelve feet deep. It was over eight feet across. The nest weighed as much as an automobile. A bald eagle's nest found in Florida was even larger than the one in Ohio.

7

The main idea of this paragraph is:

( ) An eagle's nest was found in Florida.

( ) The nest in Florida was larger than the one in Ohio.

( ) Bald eagles make big nests.

( ) An eagle's nest weighs as much as a car.

8

The heads of sharks are sometimes made into glue. The flesh of some sharks is used as food. Sometimes the flesh is used to help make the soil better for crops. Oil is gotten from the liver. Leather is made from the hide.

8

The main idea of this paragraph is:

( ) The heads of sharks are used in making glue.

( ) Shark's flesh is used as food.

( ) The hide of sharks is used in making leather.

( ) Many different things are made from sharks.

9

The giraffe, with its long neck and thin legs, is a strange looking animal. It is also an interesting animal. There are only seven bones in the giraffe's long neck, the same number as in the neck of a tiny mouse. Its thin legs are much stronger than they appear. The giraffe can run at speeds of 30 miles an hour, which is faster than most other animals.

9

The main idea of this paragraph is:

( ) Giraffes have strong legs.

( ) Giraffes can run 30 miles in an hour.

( ) Giraffes are strange and interesting animals.

( ) Giraffes have only seven bones in their necks.

10

Sound needs something to carry it. Since we are surrounded by air, most sounds reach us by traveling through the air. Sounds can travel through water. Sounds can also travel through the ground. Sounds can travel through any solid, liquid, or gas.

10

The main idea of this paragraph is:

( ) Sounds travel through the ground.

( ) Sounds travel through water.

( ) Sounds travel through air.

( ) Sounds need something to carry them.

11

Most butterflies fly in the daytime. Most moths fly at night. Unlike a moth, a butterfly rests with its wings upright. The feelers on the heads of butterflies are like threads with little clubs at the ends. Moths have feelers of many different types.

11

The main idea of this paragraph is:

( ) Most butterflies fly during the day.

( ) Moths fly at night.

( ) Butterflies are different from moths.

( ) Butterflies rest with their wings up.

12

Most people think of a desert as flat, completely covered with sand, and without water. All of these ideas are not true. The largest desert in the world is a good example. This desert, the Sahara, is located in Africa. It has several mountains, and great areas are covered with rocks and boulders.

12

The main idea of this paragraph is:

( ) The Sahara is the largest desert in the world.

( ) Deserts are flat and completely covered with sand.

( ) Some deserts are not just made up of sand.

( ) The Sahara desert is located in Africa.

13

Usually the bones of birds' wings are hollow. This gives the bones strength without weight. The surface of the wing is curved. The fact that the front edge of the wing is thicker than the rear edge also makes for easier flight.

13

The main idea of this paragraph is:

( ) The way the wing is made makes it easy for a bird to fly.

( ) The bones of a bird's wing are hollow.

( ) The surface of a bird's wing is curved.

( ) The front of the bird's wing is thicker than the back.

14

All living things are made up of cells. Your body has billions of these tiny units of living matter. Your muscles, skin, and bones are made up of cells. In fact, every part of you is made up of cells.

14

The main idea of this paragraph is:

( ) All living things are made up of cells.

( ) Cells are tiny units of living matter.

( ) Your bones are made up of cells.

( ) Your muscles are made up of cells.

15

When people overwork, they get very warm and perspire. This helps make the body cooler. Birds, however, don't perspire through their skins. Heat and water leave their bodies through their noses and mouths. When they are very hot, they open their mouths and breathe fast to get rid of heat.

15

The main idea of this paragraph is:

( ) When people work too hard they perspire.

( ) People and birds perspire differently.

( ) Birds breath fast.

( ) Birds perspire through their skins.

16

In any forest, there are hundreds and sometimes thousands of living things which are related to one another. There are plants, vines, herbs, mosses, shrubs, ferns, and mushrooms which grow in the forest. One can find birds, insects, reptiles, and mammals living in the forest.

16

The main idea of this paragraph is:

( ) There are trees in forests.

( ) Ferns and mosses grow in forests.

( ) Many living things are found in forests.

( ) Many animals live in forests.

17

There are many reasons why cattle stampede--a clap of thunder, the howl of a coyote, a flash of lightning, the firing of a six shooter, the sight of a buffalo. Once started, the blind, mad, terrible rush is a frightening thing to see.

17

The main idea of this paragraph is:

( ) There are many reasons for cattle stampedes.

( ) Cattle stampedes are scary.

( ) Thunder and lightning can frighten cattle.

( ) Cattle are frightened by coyotes.

18

The woodland jumping mouse likes to make his home near water. He can be found among the tall weeds or grasses that grow by some woodland streams. The grassland jumping mouse has a blackish tip on his long thin tail. He prefers to live in the meadows among tall weeds or thickets. Occasionally he makes his home on sagebrush flats.

18

The main idea of this paragraph is:

( ) The woodland mouse lives near water among tall weeds or grasses.

( ) There are two kinds of jumping mice that make their homes in different places.

( ) The grassland mouse has a long, thin tail.

( ) The grassland mouse likes to live in meadows among tall weeds or thickets.

19

Popcorn turns white and fluffy when it is popped. Eggs turn hard when cooked. Cake dough becomes light and fluffy when baked. Iron ore turns from a solid to a liquid when heated and back to a solid when cooled. Oils from plants can be changed to plastics. Coal, when heated, produces substances that are used to make medicines. Each day you see chemical energy at work in some way.

19

The main idea of this paragraph is:

( ) Eggs turn hard when they are cooked.

( ) We can see the effects of chemical energy all around us.

( ) Popcorn is white and fluffy when it pops.

( ) Oils from plants can be made into plastic.

20

Communities can be different in many ways. There are communities with many people in them. These are called cities. Some cities cover lots and lots of land. Other cities have little land. Most cities are built near an ocean or river. In some communities there are fewer people. These communities may have farms around them. They are called towns.

20

The main idea of this paragraph is:

( ) Cities have many people in them.

( ) Towns may have farms around them.

( ) There are different kinds of communities.

( ) Most cities are built near an ocean or river.

52

21

At one time people thought heat was an actual substance found in matter. They called this substance caloric. If something was hot, it contained a lot of caloric. If it was cold, it didn't contain much caloric. Today scientists know that heat is not a substance.

21

The main idea of this paragraph is:

( ) Heat is a substance called caloric.

( ) If something was hot, people said it had a lot of caloric.

( ) If something was cold, people said it had very little caloric.

( ) Heat is not a substance found in matter.

22

There are all kinds of things to do at the seacoast. Those who like the water can swim, sail, or fish. Many people would rather just sunbathe on the beach. Children like to wade in the shallow water and gather seashells and rocks.

22

The main idea of this paragraph is:

( ) There are many things to do at the seacoast.

( ) People can swim or go fishing at the seacoast.

( ) Children like to find seashells and rocks.

( ) People like to sunbathe at the beach.

23

Heat is probably the worst enemy of firefighters. It is heat that makes a fire spread. The heat of a spark is enough to start paper burning in a wastebasket. This small fire makes enough heat to light up curtains.

23

The main idea of this paragraph is:

( ) Heat is the firefighter's enemy.

( ) A spark can start paper burning.

( ) Firefighters have a hard job.

( ) Heat can cause curtains to burn.

24

In a steamy forest, far on the other side of the world, huge elephants are pushing heavy logs. On top of the world dogs are running over deep snow, pulling loaded sleds behind them. And across far-off deserts camels sway, carrying folded tents and goods for trade. All over the world animals are moving loads for people.

24

The main idea of this paragraph is:

( ) Dogs pull loaded sleds in the snow.

( ) Elephants push heavy logs.

( ) Camels carry folded tents.

( ) Animals can help move loads.

25

The oldest metal in the world is copper. It was used by cave dwellers over 10,000 years ago. It is found on every continent in the world. Scientists believe that there is even copper in the sun.

25

The main idea of this paragraph is:

( ) Copper may be found in the sun

( ) Copper was used by cave dwellers.

( ) Copper is found all over the earth.

( ) Copper is the oldest metal in the world.

26

Spiders are not insects like the grasshoppers, flies, and other creatures which are often caught in webs. A grown-up insect has six legs and a body that is divided into three parts, called head, thorax, and abdomen. A spider has eight legs and a two-part body, for the head and the thorax are together. The nearest relatives of spiders are daddy longlegs, ticks, and scorpions.

26

The main idea of this paragraph is:

( ) An insect has six legs.

( ) A spider has a two-part body.

( ) The nearest relatives of spiders are daddy longlegs, scorpions, and ticks.

( ) Spiders are not insects.

27

Different parts of the body have different temperatures. The average temperature for the body itself is 98.6 degrees. The skin is eight to ten degrees cooler. In cold weather hands and toes may be fifty degrees cooler. No wonder we need gloves and heavy socks in winter.

27

The main idea of this paragraph is:

( ) Different parts of the body are different in temperature.

( ) The skin is cooler than the rest of the body.

( ) 98.6 is the average body temperature.

( ) Hands and toes may be much cooler than the rest of the body.

28

Rain is the biggest danger to baby birds. During rainy weather, the parents have to leave the nest in search of food. The baby birds are left uncovered. The babies get chilled. Thousands have been known to die during long rainstorms.

28

The main idea of this paragraph is:

( ) Baby birds are left uncovered in the rain.

( ) Birds search for food for their babies.

( ) Rainstorms are very dangerous to baby birds.

( ) Birds get chilled in the rain.

29

Most people believe rubber shoes were invented not long ago. They are worn to protect our feet against rain and snow. But the first rubber shoes are not an invention of modern science. They were first made by Mayan Indians long, long ago.

29

The main idea of this paragraph is:

( ) Rubber shoes are worn by many people.

( ) Rubber shoes were first made by Mayan Indians long ago.

( ) Rubber shoes protect our feet from rain and snow.

( ) Rubber shoes were invented by modern science.

30

Directions are easy to find on a map. The top of the map is usually north. The bottom is south. East is to the right, west to the left. On some maps there is an arrow or a picture of a compass that shows where north is.

30

The main idea of this paragraph is:

( ) The top of a map is usually north.

( ) Directions can be found easily on maps.

( ) On some maps there is a picture of a compass.

( ) Maps are very important.

31

To the people of the far North, the reindeer is sheep, goat, cow, and horse. The animal supplies the people with meat, milk, and clothing. It also provides the chief means of transportation in its cold northern home.

31

The main idea of this paragraph is:

( ) The reindeer is used for transportation.

( ) The reindeer supplies people with milk and food.

( ) The reindeer is found in the far North.

( ) The reindeer does the job of many animals.

32

If you have ever lightly touched a piano string when a key is struck, you relize that the piano string moves. If you grasp the string firmly with your fingers, the sound ceases. The movement of the piano string is called vibration; vibrations are what make sound. When you prevent the piano string from vibrating, you stop the sound.

32

The main idea of this paragraph is:

( ) Vibrations are what make sound.

( ) Piano strings move when a key is struck.

( ) The movement of a piano string is called vibration.

( ) When you stop a piano string from moving, the sound stops.

33

Babies have to learn to see. Newborn babies can't see shapes clearly. They can tell the difference between very bright things and very dark things, but they can't follow things. It takes them a few weeks to see shapes and a few months to see colors.

33

The main idea of this paragraph is:

( ) A baby can see shapes when it is a few weeks old.

( ) A baby cannot see clearly when it is first born.

( ) A baby can see colors when it is a few months old.

( ) A baby can tell the difference between light and dark.

34

Rivers are not all the same color. In some cases the color of a river is caused by the river bottom. It may be due to the color of its banks, which a river reflects. The river color may be caused by what is found in the river.

34

The main idea of this paragraph is:

( ) Rivers are different colors for different reasons.

( ) The color of a river may be a reflection of the banks.

( ) The color of a river is sometimes due to what is found in it.

( ) The river bottom sometimes makes the river a different color.

35

Dogs are faithful. Horses are fast. Oxen are steady. Llamas are sure-footed. Water buffalo are patient. But the king of all the load movers is the elephant.

35

The main idea of this paragraph is:

( ) Horses are fast runners.

( ) Dogs are faithful animals.

( ) Elephants are the best load carriers.

( ) Oxen are steady when they carry loads.

36

Reindeer are well protected from the cold. They have thick coats of hair. Each hair is hollow and is full or air. A reindeer's wide hoofs keep it from sinking into the snow.

36

The main idea of this paragraph is:

( ) Reindeer have thick coats of hair.

( ) Wide hoofs keep reindeer from sinking in the snow.

( ) The hair on the reindeer is hollow.

( ) Reindeer are protected from cold weather.

37

It is best for a fish's health that it not be handled. Yet some fish like to be petted. Old and tame goldfish like to be stroked. Some fish will swim right into their owner's hand. The Sea Horse will swim into anyone's hand.

37

The main idea of this paragraph is:

( ) A sea horse will swim into someone's hand.

( ) It is bad for a fish's health to be handled.

( ) Goldfish like to be stroked.

( ) Some fish like to be handled.

38

American Indians discovered and developed many kinds of medicines. Nearly 60 of these medicines are in use today. One of these medicines is quinine. It has been used for many years to fight the disease of malaria. Dentists use novacaine before they work on people's teeth. This is another medicine discovered by Native Americans.

38

The main idea of this paragraph is:

( ) American Indians discovered many medicines we use.

( ) Dentists use a medicine called novacaine.

( ) Quinine is used to fight a sickness called Malaria.

( ) Medicines are used to fight many diseases.

39

You may say that the sun does not look like a star. It is much larger than a star. It does not seem to twinkle as other stars do. It shines in the daytime, and the other stars shine at night. But the sun is a star just the same.

39

The main idea of this paragraph is:

( ) The sun is not a star.

( ) Stars shine at night.

( ) The sun is a star.

( ) The sun is much larger than a star.

40

Icebergs can be dangerous. They can run into a ship that is anchored to one spot. Or a ship can run into an iceberg. Icebergs are hard to see. Do you know why? Because only a small part of the iceberg is floating above the water. Most of the iceberg is below the water.

40

The main idea of this paragraph is:

( ) Most of an iceberg is under water.

( ) Icebergs are hard to see.

( ) Icebergs can float in the water.

( ) Icebergs can be very dangerous.

41

Most small land birds fly about twenty-five miles per hour. Ducks and geese fly about forty miles per hour. Eagles have been known to fly over one hundred miles an hour. Swifts have been times at almost two hundred miles per hour.

41

The main idea of this paragraph is:

( ) Ducks fly about 40 miles per hour.

( ) Different birds fly at different speeds.

( ) Eagles fly faster than ducks.

( ) Swifts fly 200 miles per hour.

42

Young sparrows aren't as big as older sparrows. There is another difference. The young sparrows of all kinds are more streaked than the adults. Sometimes there is a difference in color between the male and female. Then the young tend to look more like the female.

42

The main idea of this paragraph is:

( ) Young sparrows are smaller than older sparrows.

( ) Young sparrows are more streaked than older sparrows.

( ) Adult sparrows look different from young sparrows.

( ) Young sparrows look like female sparrows.

43

The buttons museum has a large group of uniform buttons. This group is so large it is divided into smaller groups. There are buttons from navy uniforms. There are buttons from police uniforms. There are even buttons from the jackets of train conductors.

43

The main idea of this paragraph is:

( ) The buttons museum has buttons from navy uniforms.

( ) There are police uniform buttons in the buttons museum.

( ) Train conductors have interesting buttons on their jackets.

( ) The buttons museum has a big group of buttons from uniforms.

44

To people who live in the country the sounds of a city--the screech of car brakes, the roar of automobile engines, the scream of factory whistles, the honking of horns--aren't very pleasant. To many city people, however, these sounds seem almost like music.

44

The main idea of this paragraph is:

( ) People feel differently about the sounds of the city.

( ) The noise of honking horns often frightens people who live in the country.

( ) People who live in the country do not find factory whistles pleasant.

( ) Many city people find city sounds pleasant.

45

Every country has its own customs. Customs are the way things are usually done. For example, it is the custom in America to shake hands when we meet someone. In some other countries they bow.

45

The main idea of this paragraph is:

( ) In America, we shake hands when we meet someone.

( ) People in different countries wear different clothes.

( ) Every country has different customs.

( ) Some people bow when they greet someone.

46

In science, things usually can be seen; so scientists know what they are studying. But energy can't be seen; you don't know for sure what it is. However, you can see its effects; you know energy is present.

46

The main idea of this paragraph is:

( ) Energy can be seen.

( ) Scientists study energy.

( ) Scientists use a microscope to see energy.

( ) You can only see the effects of energy.

47

Many place names in the United States are words from American Indian languages. About half the states have Indian names. Minnesota is one. Minnesota is a Sioux word meaning "sky-colored waters." Some the the cities that have names from American Indian languages are Biloxi, Cheyenne, Chicago, and Milwaukee.

47

The main idea of this paragraph is:

( ) Chicago is an Indian name.

( ) Many places in the United States have Indian names.

( ) Half of the states have Indian names.

( ) Minnesota means "sky-colored waters" in one Indian language.

48

On December 17, 1903, Orville Wright made the first successful airplane flight. The flight covered a distance of 120 feet. On July 20, 1969, Neil Armstrong became the first human being to set foot on the moon. The flight from Earth to the moon covered over 220,000 miles. People and their flying machines had come a long way in only 66 years.

48

The main idea of this paragraph is:

( ) Flying machines can fly much longer distances than they used to.

( ) Orville Wright made the first airplane flight.

( ) The flight to the moon was over 220,000 miles.

( ) Neil Armstrong was the first man to go to the moon.

Appendix B

TASK 1: DIRECTIONS AND ITEMS

Directions:

You will be given 12 paragraphs to read. After reading each paragraph, turn the page and put an X in the box with the best statement of the main idea.

1

It was the first day of school. Teddy seemed a bit nervous. But, Mom took him to school just the same. We were all pleased that Teddy was going. We knew it would do him alot of good to learn new things. It was important that Teddy be trained properly for the show next Spring. A prize at the dog show would make the whole family proud of Teddy. And this school was highly recommended.

Where is Teddy going today?

( ) an elementary school

( ) a show

( ) a dog school

( ) for a walk

2

Mr. Smith works very hard at his job. He has to practice every day for several hours. He dances with his partner for a long time before they get the act to look smooth. They can't perform before the act is perfect. People come from all over the state to see Smith and Jones do their show. They especially enjoy watching Mr. Smith, the dancing bear, do his graceful turns on the dance floor.

Who is Mr. Smith?

( ) a dancing teacher

( ) an actor

( ) a bear

( ) a man who works very hard

3

John was feeling very nervous about the robbery at the gas station. He heard the screaming sirens. They made him shiver. He was about to run when he saw a policeman approach. Even though he was afraid, John felt relieved at the arrival of the police. This was the first time he had ever witnessed a crime.

Why was John nervous?

( ) He was a policeman

( ) He worked in a gas station

( ) He robbed a gas station

( ) He saw a robbery

4

Johnny enjoyed feeding all of the animals. It was a beautiful sunny day at the zoo, and many parents took their children there for the afternoon. Johnny fed the elephants first. Then he went into the Reptile House and fed all of the snakes. After he finished feeding all of the animals, Johnny had to clean out all of the cages.

Who is Johnny?

( ) a boy who is visiting the zoo

( ) an animal at the zoo

( ) a person who works at the zoo

( ) a boy who likes snakes

5

Mrs. James had a terrible headache. The doctor would be coming shortly. He had an emergency call at the hospital but would be coming straight from there. Mrs. James was anxious to hear what the doctor would say. She was worried. Sally might not be able to sleep through the night.

Why is Mrs. James upset?

( ) She has a headache

( ) The doctor is out of town

( ) Sally is sick

( ) She is tired

6

Posters all over town announced the coming of the circus. It would be here in two weeks, and Mom promised to take me and my sister. There is always so much to do in our town. My sister and I look forward to school vacations so we can see different shows. Today, Mom is taking us to the new show at the museum. We have been looking forward to it since it opened.

Where are we going today?

( ) on vacation

( ) to the circus

( ) to school

( ) to the museum

7

Susan was wearing her yellow and white prom gown. She thought about the night of the high school prom with a smile on her face. It was her first real night on the town. She had danced to the music of a great band. Then there was the party at Tom's house. It was the latest she had ever stayed up. As Susan got ready to leave for her brother's party she continued to think about the first time she had worn her dress.

Where is Susan going tonight?

( ) dancing

( ) to Tom's party

( ) to her high school prom

( ) to a party at her brother's house

8

Betty Jones will be walking with a cane. She has white hair pulled back in a bun. She has wrinkles on her face. The dress she is wearing looks like it was worn many years ago. Miss Jones finishes with her make-up and is ready. It is difficult for a young woman to play the role of a grandmother. It has taken much practice to look, walk, and talk like an old woman.

Betty Jones is

( ) an actress

( ) an old lady

( ) a hair stylist

( ) a poor person

9

The summer was so warm and sunny. We had perfect weather for the beach on weekends. Some of my friends would come with us and we would play all day long. We swam and built sandcastles. We even had rubber rafts to float on. It's too bad that we couldn't go to the beach today. It's supposed to be a beautiful fall day but school is here again. It's nice to think about the fun days at the beach.

What time of year is it?

( ) Winter

( ) Fall

( ) Summer

( ) Spring

10

Mr. Simpson was very happy with his work. He had always wanted to do painting. Even as a child he had a good eye for color and design. He used to spend hours mixing the colors in his paint set. Mr. Simpson did a good job in Mrs. Adams house. The brightly colored walls make the home look new. Mr. Simpson is a real artist with a paint brush.

Mr. Simpson now paints

( ) beautiful pictures

( ) interesting designs

( ) old furniture

( ) people's homes

11

Jane couldn't wait to find out what happened. Mr. James had taken the kitten in the middle of the night without waking anyone. He was mean enough to harm it just to get even with his neighbor. Jane would have to wait to find out if the kitten was alright. The next story hour at the library wasn't until Tuesday.

Who is Mr. James?

( ) he works at the library

( ) he has a daughter named Jane

( ) he is a character in a story

( ) he kidnapped a kitten

12

Steven loves to take care of the garden. He takes pride in the beauty of the flowers and trees. He enjoys watching the vegetables grow. Mrs. Evans loves to have fresh vegetables for her family's dinner. Steven goes back to his apartment in the city after each day of work feeling lucky to have spent the day in the country.

Steven lives

( ) on a ranch

( ) in the country

( ) in the city

( ) on Main Street

Appendix C

TASK 2 RECALL PARAGRAPHS: DIRECTIONS, ITEMS, KEY WORDS AND CONTENT WORDS

Directions:

You will be given eight short paragraphs to read to yourself. You will be asked to read them one at a time. After you read each paragraph, I will ask you to tell me all that you remember from the paragraph, what it was about.

Designated Key Words and Content Words for Task 2 Recall Paragraphs

Paragraph 1:

The tiger's coat is reddish tan on top. Underneath, it gets somewhat white. It is covered with black stripes. There is a plant with orange flowers and black stripes like the tiger's fur. This flower is called the tiger lily.

Key words/ideas	Content words/ideas
there is	coat reddish tan
called	white underneath
like or similar	black stripes

Paragraph 2:

People have written stories about snakes crushing and squeezing their enemies into pulp. Such stories about snakes crushing their enemies out of shape with a tremendous force are not true. Snakes just squeeze enough to stop their enemies from breathing.

Key words/ideas	Content words/ideas
not true	stories written
just or only enough	snakes crushing/squeezing enemies
	into a pulp
	crushing out of shape
	with tremendous force

Paragraph 3:

Stories have been told of how great octopuses, with their eyes like humans' eyes and their many arms, pulled ships and crews beneath the water forever. The truth is, however, that

the octopus is a timid animal, ready to slither to the safety of the ocean floor.

Key words/ideas	Content words/ideas
have been	stories told
the truth is, really	eyes like humans
but, however	many arms
timid	pulled ships/crews
safety	underneath forever/to the bottom

Paragraph 4:

When we think of salt water, we think of the world's oceans and seas. When we think of fresh water, we think of ponds, lakes, rivers, and streams. Yet a large amount of fresh water is often found at certain places in the sea.

Key words/ideas	Content words/ideas
but	salt water in oceans, seas
salt water in the sea	fresh water in ponds, lakes, rivers, streams

Paragraph 5:

Not all animals help old animals. Some animals drive the old or sick relatives away and even kill them. Young elephants have been known to feed blind old elephants who can't find food. Pictures have been taken of young elephants actually putting food into an old elephant's mouth.

Key words/ideas	Content words/ideas
but	not all animals help old
young elephants feed old elephants	drive old/sick away
	kill them

Paragraph 6:

Groundhogs are not popular with farmers. They eat the farmer's grain, raid their vegetable gardens, and leave hidden holes for cattle to stumble into. But scientists who study hibernation still find the groundhog an interesting fellow to have around. And people who enjoy folklore and legends watch faithfully to see if he will come out and see his shadow on Groundhog Day.

Key words/ideas	Content words/ideas
but, however, still, yet	aren't popular with farmers
other people	eat grain
scientists	raid vegetable gardens
	leave holes for cattle

Paragraph 7:

While picking up mail from the mailbox, one letter carrier found a small bird mixed in with the mail. The bird was unhurt. Another carrier, while emptying a street mailbox, found a frog sitting on top of the letters. Through the years mail carriers have found keys, wallets, food, hats, boots, and about as many different items as will fit through the slot of the mailbox.

Key words/ideas	Content words/ideas
many items, different things	one letter carrier found a bird
anything that could fit	bird was unhurt
	another found a frog
	keys, wallets, food, hats, boots

Paragraph 8:

During colonial days, shoemakers began to fear that people wouldn't wear out enough shoes because of the increased use of wagons. In more recent years shoemakers thought the use of radio and TV might keep people at home and ruin the shoe business. The fact is, however, that people today buy more shoes than ever before.

Key words/ideas	Content words/ideas
use of past tense-- thought, beleived	In colonial days fear
use of conditional-- wouldn't, might	people wouldn't wear shoes
the fact is, however, but, now	increased use of wagons
people buy more than before	recent use of radio and TV

Appendix D

TASK 3: DIRECTIONS AND ITEMS

Directions:

I will be reading some groups of sentences to you. They will contain a made-up word called a grobnick that stands for something. For each group of sentences, I want you to listen and try to figure out what a grobnick stands for. Let's try one as an example:

> A grobnick is found in a garden. Some grobnicks are tall. A grobnick needs water to grow. Grobnicks can be put in a vase.

1

A grobnick is made of rubber. Children often have grobnicks. You can hold a grobnick in your hand. A grobnick can be found on a pencil.

2

A grobnick needs gasoline. A grobnick has two wheels. You can ride through the park on a grobnick. A grobnick can have a horn.

3

A grobnick is usually square. You can sometimes see yourself in a grobnick. A grobnick is found in many rooms. You can open a grobnick when it is too hot.

4

Babies ride in a grobnick. A grobnick has four wheels. A grobnick can take children from place to place. You can see a grobnick on many streets.

5

You hear a grobnick when someone is at your door. A grobnick is found in your house. A grobnick rings when someone wants to talk to you. Children often play with grobnicks.

6

Everyone has two grobnicks. Grobnicks are somewhere on your body. You couldn't walk very well without grobnicks. You have lashes on your grobnicks.

7

Grobnicks are found in store windows. Grobnicks can be tall. Grobnicks wear clothes. Grobnicks have arms and legs.

8

A grobnick can be found in the kitchen. A grobnick can hold milk. You can drink from a grobnick. A grobnick comes with a saucer.

9

A grobnick has black and white keys. A grobnick stands on four legs. A grobnick can be found in someone's living room. You can sit at a grobnick.

10

A grobnick has a loud siren. A grobnick brings help to people who are in trouble. A grobnick comes quickly when you need one. A grobnick is red.

11

A grobnick gives you all the news of the day. People like to read a grobnick. Grobnicks can be found in the library. A grobnick has words printed in it.

12

Grobnicks can be found in a closet. You wear grobnick in the winter. Grobnicks can keep you very warm. You put grobnicks on you hands.

13

It is easy to cut paper dolls with a grobnick. A grobnick is sharp. You cut things with a grobnick. You can find a grobnick in the kitchen.

14

You can use grobnicks when you park at a meter. You can carry grobnicks in a wallet. You can use grobnicks to buy things. Grobnicks don't weigh very much.

15

You can put a cake in a grobnick. A grobnick has a handle to open it. A grobnick is found in the kitchen. A grobnick keeps things cold.

16

When you lie back in your bed you see a grobnick. You hang things on a grobnick. There are grobnicks in your house. You can paint a grobnick.

17

You can stand on a grobnick. A grobnick is usually made of wood. You can walk on a grobnick. Actors perform on a grobnick.

18

A grobnick has dials on it. You can play music on a grobnick. You can make a grobnick loud or soft. You put a record on a grobnick.

19

Grobnicks have whiskers. You can take a grobnick for a walk. Grobnicks have hair. You can have fun playing with a grobnick.

20

A grobnick is round. You can play with a grobnick. A grobnick can travel through the air. You can blow up a grobnick.

21

A grobnick can be found in a grocery store. A grobnick is round and red. You can eat a grobnick. You put grobnicks in a salad.

22

A grobnick twinkles. You can see a grobnick in the sky. Some people wish on a grobnick. A grobnick can be seen at night.

23

Some people wear grobnicks all the time. Grobnicks are worn on your head. A doctor may tell you to wear grobnicks. Grobnicks help you see better.

24

A grobnick can give you homework. Every school has grobnicks. You can learn from a grobnick. A grobnick can make you a better reader.

Appendix E

TASK 4: DIRECTIONS AND ITEMS

Directions:

You will be given eight new paragraphs to read. Just read them at your own pace.

1

Social studies deals with basic human activities. How people live and work and play, how they travel from place to place, how they exchange thoughts and ideas, how they make and enforce laws - these are only a few of such activities. When and where people carry on their activities is also a concern of social studies.

2

Folk tales were told orally for many years before they were written down. Parents told them to their children, and when the children grew up, they told them to their own children. When the tales were finally written down, no one knew who had first told them.

3

Before you read anything, you should look it over quickly. This can help you decide whether or not you want to read it. Or, if you already know you are going to read it, previewing can help you decide what your aim in reading will be and what your reading speed should be. It can also give you an idea of what the selection is about.

4

Photography opened a whole new world of ideas. For instance, after the high-speed camera was developed, studies of moving animals were made. Photographs of running horses seemed to show that horses had all four feet off the ground.

5

In the desert there are sometimes only three inches of rain a year. Thirty inches of rain a year helps farmers have very good crops. Sixty inches of rain is too much. It is likely to cause floods and damage to crops.

6

Perhaps you have heard someone say that people live on Mars, that the planet is inhabited. You may have heard someone talk about men from Mars who were supposed to have come to earth in space ships called flying saucers. People have had such imaginative notions about traveling Martians on and off for centuries. As far as we know, there has never been any evidence to support such beliefs.

7

Almost all seaweeds are attached to rocks or something else. The ones we see on beaches have been torn loose. One kind of seaweed that isn't attached is called gulfweed. It drifts along in large masses in the ocean.

8

Long hair on boys and men is commonplace in the United States. In certain other countries, however, this is not the case. If boys wear long hair on the streets of Hong Kong, they are sent to jail. In Taiwan, motion pictures with long-haired actors are not shown.

Paragraph 6:

Groundhogs are not popular with farmers. They eat the farmer's grain, raid their vegetable gardens, and leave hidden holes for cattle to stumble into. But scientists who study hibernation still find the groundhog an interesting fellow to have around. And people who enjoy folklore and legends watch faithfully to see if he will come out and see his shadow on Groundhog Day.

Key words/ideas	Content words/ideas
but, however, still, yet	aren't popular with farmers
other people	eat grain
scientists	raid vegetable gardens
	leave holes for cattle

Paragraph 7:

While picking up mail from the mailbox, one letter carrier found a small bird mixed in with the mail. The bird was unhurt. Another carrier, while emptying a street mailbox, found a frog sitting on top of the letters. Through the years mail carriers have found keys, wallets, food, hats, boots, and about as many different items as will fit through the slot of the mailbox.

Key words/ideas	Content words/ideas
many items, different things	one letter carrier found a bird
anything that could fit	bird was unhurt
	another found a frog
	keys, wallets, food, hats, boots