

## **THE DETECTION OF READER-BASED VERSUS TEXT-BASED INCONSISTENCIES AND THE EFFECTS OF DIRECT TRAINING OF COMPREHENSION MONITORING AMONG UPPER-GRADE POOR COMPREHENDERS**

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*Abstract.* This paper reports the results of two studies which focus on the comprehension monitoring abilities of middle-grade poor comprehenders. In Experiment 1, the ability of 54 middle-school students to detect and correct text-based and reader-based inconsistencies was compared. The results indicated that the students could detect and correct reader-based inconsistencies to a significantly greater degree than text-based inconsistencies. Twenty-four of the same students participated in Experiment 2, which was designed to investigate the effects of direct training of comprehension monitoring. One-half of the students received direct instruction in two sessions; the other half served as a control group. Following training, the experimental group scored significantly higher on reader-based inconsistencies than the control group, but no significant group differences were found for text-based inconsistencies. Implications for future research are discussed.

Empirical research over the past decade has revealed much about the basic cognitive processes involved in reading comprehension. Given this strong basic research foundation, however, much of the existing knowledge has not been incorporated in applied research studies which focus on reading comprehension (Pearson, 1982). One such cognitive process which has been the focus of considerable basic research and, of late, applied research is in the area of comprehension monitoring.

Comprehension monitoring is the ability to regulate one's ongoing comprehension processes. Throughout the literature on comprehension monitoring, the error

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detection paradigm is frequently used to measure whether a reader engages in such self-regulating behaviors (Baker, 1979; Baker & Anderson, 1982; Garner, 1980, 1981; Garner & Taylor, 1982; Markman, 1979; Winograd & Johnston, 1982; Baker, Note 1). Problems associated with error detection have been pointed out (Winograd & Johnston, 1982). For example, subjects tend to do poorly on the error detection task, subjects' purpose for reading may not match the purpose intended by the experimenter, probes to determine if subjects notice errors may be over-used, and the accuracy of subjects' post-task verbal reports is difficult to ascertain. Nevertheless, there is a strong rationale for using error detection, since it is important for readers to monitor their ongoing comprehension; if they are doing this, they should notice when there is some conflict between ideas in the text (Baker, 1979) or between the text and readers' prior knowledge.

It has been demonstrated that poor readers have considerable difficulty detecting text inconsistencies (Garner, 1980, 1981; Garner & Kraus, 1981-1982; Winograd & Johnston, 1982). Even when given "attentional assistance" or prompts, poor comprehenders have little facility in monitoring inconsistencies (Garner & Taylor, 1982). Further, even good comprehenders have some difficulty on error detection tasks (Garner & Kraus, 1981-1982; Markman, 1979; Baker, Note 1). Thus, the detection of text inconsistencies does not appear to be a simple task for many readers.

While a variety of factors may account for the difficulties readers experience (Winograd & Johnston, 1982), a primary factor noted by Markman (1979) and Baker (Note 1) relates to the standard or concept of the comprehension process which readers use. Since readers may apply different standards to evaluate their understanding, such as individual word, text-based, or reader-based meanings, the type of inconsistency present in the text might influence task success. Examination of previous studies with poor comprehenders which report poor performance reveals that the majority have utilized only passages with text-based or detail inconsistencies, the most difficult to detect. Their performance on passages with reader-based inconsistencies, that is, those that violate what the reader knows about the world, has not been investigated. Thus, the conclusion typically drawn that poor readers and poor comprehenders do not monitor their comprehension while reading may not be entirely accurate. The purpose of Experiment 1, therefore, was to determine whether poor comprehenders have equal difficulty detecting text-based and reader-based inconsistencies while reading. It is hypothesized that many of the poor comprehenders will demonstrate poor monitoring skills regardless of the type of inconsistency.

The purpose of Experiment 2 was to investigate the effects of direct training of comprehension monitoring on those subjects who demonstrated poor monitoring abilities in Experiment 1. Results from a direct training investigation may be translated into suggestions for reading comprehension instruction. In addition, a direct

training study in the area of comprehension monitoring may be one means to demonstrate to teachers the importance of focusing on the process of learning rather than merely the content of learning (Meichenbaum & Asarnow, 1979).

Prior research has demonstrated the success of direct training studies. Campione, Nitsch, Bray, and Brown (1980), for example, taught mentally retarded children to improve their memory skills. Hansen and Pearson (1982) taught good and poor readers to improve their inferential reading comprehension, and Garner and Reis (Note 2) taught good and poor comprehenders to improve their use of text lookbacks to answer comprehension questions. The success of the training approaches in each of these studies would appear to be related, at least in some part, to the subjects' abilities to monitor or regulate their understanding of text. However, the primary purposes of these investigations were to improve memory skills, increase inferential comprehension, or train lookback usage, respectively. To date, despite an abundance of research in the area (see Wagoner, in press, for a thorough review), the effects of direct training of comprehension monitoring itself have not been investigated.

## EXPERIMENT 1

### METHOD

#### *Subjects*

Fifty-four sixth- and seventh-grade students attending a middle school were selected as subjects for the study. To be included in the sample group, a student needed to meet two criteria. First, based on teacher judgment, each student was judged as a poor comprehender. Second, each student's raw score on the reading comprehension subtest of the Stanford Diagnostic Reading Test (Karlsen, Madden, & Gardner, 1976) had a grade equivalent score between two and three years below grade level. Subjects' mean score on this test was 26.78 (S.D. = 3.75), which corresponded to a mean grade equivalent score of 4.5.

#### *Materials*

Three three-part stories containing text-based inconsistencies and three three-part stories containing reader-based inconsistencies were generated for the two experiments reported. Each of the stories met several criteria. First, to be easily decoded by poor readers, the readability level was third grade (Fry, 1968). This was verified by six average readers from grades two and three. None of these readers had more than two miscues for each of the stories read. Second, each story part contained either a text-based or reader-based inconsistency. To verify the investigators' classification of type of inconsistency, six graduate students in reading

categorized each inconsistency. When there was not agreement among five of the six raters, the investigators rewrote the particular part of the story. Third, the stories had to be segmentable so that three checks of comprehension monitoring could be made during the experimental task without seriously disrupting the meaning flow. Thus, each part of each story contained an inconsistency.

Each story segment used in the study was typed on a separate sheet, and these were stapled together to form a small booklet. A sample of each type of inconsistency appears below. Here, passage inconsistencies are underlined; on student materials, underlining did not appear.

#### Text-Based Inconsistency

Sue lived in Boston, but for the weekend she was staying at Aunt Mary's house in Smithfield. She shared the den of the house with three of her cousins, Jane from Newton, and Fran and Ellen from Concord. Fran and Ellen lived around the block from each other. The girls enjoyed staying at their Aunt's house. There was always something to do. They especially enjoyed the town. *Southport* was a fun place to visit.

#### Reader-Based Inconsistency

It was very warm as Don and Sue walked outside. The sun was shining brightly and they knew the day would be a hot one. They packed the car with food, swim fins, and sun tan oil. In a short time, they would be ready to begin the ride to the beach. Before they left, they made sure they had everything. At the last moment, Sue ran into the house to get her *wool coat*.

After the subject read each story segment, the following task appeared on the bottom half of the sheet.

1. Check one of the boxes:

☐

Everything makes sense.

☐

Something does not make sense.

2. Would you make any change?

☐

Yes

☐

No

3. If you marked Yes in Question 2, what change would you make? Make the change on the story above.

#### Procedure

Each subject was seen individually in a room apart from the classroom. The investigator and subject sat diagonally across from each other. After a short con-

versation intended to reduce anxiety, each subject was given the following directives:

I have some short stories which I am going to ask you to read. Each story has three parts. You may read them in whatever way you feel most comfortable, either silently to yourself or out loud. As you read each part, I will ask you to check one of two boxes (shown). One box says, "Everything makes sense"; the other box says, "Something does not make sense." I will also ask you whether you would make any changes and if you would, to make the change on the story. (Subject is talked through an example.) Do you understand what you are going to do? (pause) Good.

After the subject listened to the directions and completed the example, he/she read one of the three stories with reader-based inconsistencies and one of the three stories with text-based inconsistencies. The presentation order of the particular reader-based and text-based stories read and of the type of inconsistency was counterbalanced. Each subject was randomly assigned to one of eighteen possible presentation orders for the stories.

The subject's responses on each part of the stories were scored either *one* or *zero*. For a subject to receive a score of *one*, it was necessary for the subject to correctly complete all three steps of the task. First, the box marked, "Something does not make sense" had to be checked. Second, in response to the question "Would you make any change?", the subject had to check the box marked "yes." Finally, an indicated change in the story had to be made by the subject; the change had to be rated acceptable to both investigators. If these steps were not all completed correctly, the subject received a score of *zero*. In summary, each subject received two stories in which the highest possible scores for each story was three.

## RESULTS

An analysis of variance with type of inconsistency (reader-based/text-based) as a within-subject variable was used in analyzing the data. The results of the ANOVA yielded a significant result,  $F(1, 106) = 33.12, p < .01$ . Subject scores for the reader-based stories ( $M = 1.30, S.D. = .73$ ) were significantly greater than for the text-based stories ( $M = .50, S.D. = .69$ ).

## EXPERIMENT 2

Often students do not read text correctly or their experiences are in conflict with the ideas expressed in the text. Experiment 2 simulated these two conditions with inserted text- and reader-based inconsistencies. In addition, in Experiment 1 the subjects had demonstrated differential detection of text inconsistencies. Almost

all of the subjects had difficulty with detecting text-based inconsistencies, and also had, at least in some part, difficulty with the reader-based inconsistencies. The purpose of Experiment 2, therefore, was to determine whether direct training in comprehension monitoring could increase poor comprehenders' detection of both reader-based and text-based inconsistencies.

## METHOD

### *Subjects*

The subjects' error detection scores from Experiment 1 were used in determining the sample for Experiment 2. Only those subjects who received a total raw score of zero for detecting text-based inconsistencies were included in Experiment 2. The subjects' corresponding reader-based scores varied from zero to three with a mean score of 1.03 (S.D. = .80). The 30 subjects were then randomly divided into treatment and control groups based on their reader-based scores; that is, if six subjects received a score of two in Experiment 1, then three were randomly assigned to the treatment group and three to the control group. Due to student absences and scheduling problems, six subjects were unable to complete the study. Therefore, there were 12 subjects in the treatment group with a mean reader-based score from Experiment 1 of 1.08 (S.D. = .86), and 12 subjects in the control group with a mean reader-based score from Experiment 1 of 1.08 (S.D. = .76).

### *Materials*

The materials described in Experiment 1 were used for the second experiment. The subjects read one text-based and one reader-based story in each of the two testing sessions in Experiment 2; that is, each subject read four new stories which had not been read for Experiment 1.

### *Procedure*

Each subject was seen individually by one of the investigators in the same room used for Experiment 1. After a short conversation, each subject received either training (treatment group) or brief instruction (control group) for the experimental task.

The training script evolved from a variety of ideas suggested by Brown, Campione, and Day (1981), Campione, Nitsch, Bray, and Brown (1980), Loper (1980), Meichenbaum (1980), and Pearson (1982). Some of the recommendations used included the following: (a) the skill to be learned should be instructionally relevant—subjects were taught to determine if text made sense based on the textual content and their knowledge of the world; (b) training should extend beyond a single

occasion—there were two training sessions in the present study; (c) training should proceed from simple to more complex—in the first and second training sessions the first training example used a single sentence, while the second example used a paragraph containing four sentences; (d) the self-monitoring of a specific strategy should be taught—instruction with discussion and a summary of “Things to Do” was provided for the training groups; and (e) the learners should be given explicit instructions concerning when and how to use the strategy—this was tied into the list of “Things to Do,” which the subjects were instructed to use as they completed the task.

The training script used the notion of an editor of text as one who is responsible for monitoring the comprehensibility of text. The training script appears below. The pronouns used in the script matched the sex of the subject.

About a week ago, I was talking to a student about your age who told me that she had been chosen to be an editor of her school newspaper. Do you know what it means to be an editor? (PAUSE) What does an editor do? (ALLOW CHILD TO EXPLAIN)

When I asked this student to tell me what she does as an editor, she said that one of her most important jobs is to make sure that all the stories and news items are written correctly before they are printed. She has to read the stories very, very carefully and keep asking herself whether the words and sentences make sense and are easy to understand. She said that sometimes the stories are so well written that she doesn't have to make any changes. But sometimes she has to correct them so that the words and sentences make sense. She said that being an editor is a very important job and has helped her to read and to write more carefully.

She showed me how she does her job. After she reads each sentence, she asks whether it makes sense. She showed me these two examples. (SHOW CARD) Read them and see if you can find anything in either one of them which doesn't make sense.

1. It was early in the morning and the sun was coming up.
2. John brushed his teeth after he went to bed.

(If child correctly identifies sentence with error) Good. You found the sentence with something that doesn't make sense. How would you change it so that it would make sense. (PAUSE) Good. By thinking about your own experiences, you knew it didn't make sense for John to brush his teeth AFTER he got in bed.

(If child doesn't identify sentence with error) Let's read the sentences together and see if we can find anything that doesn't make sense. First sentence: Does it make sense to say that the sun was coming up early in the morning. (PAUSE) Think about your own experiences. Yes, it does make sense. Now let's look at the other sentence. (PAUSE) Think about your own experiences. No, it doesn't make sense for John to brush his teeth AFTER going to bed. How would you change it? (PAUSE) Would it make more sense if we changed *after* to *before*. (PAUSE) Now the sentence reads: John brushed his teeth before he went to bed. Does that make more sense?

The editor also told me that sometimes when she is reading she has to look back at earlier sentences to keep checking whether or not the information makes sense. She showed me this example: (SHOW EXAMPLE)

Danny was looking for a new blue shirt. He only had time to go to one store. He went to K-Mart. While he was in Sears, he found the perfect shirt.

Read this and see if you can find anything that doesn't make sense.

(If child correctly identifies error) Good. You found the sentence with something that doesn't make sense. How would you change it so that it would make sense? (PAUSE) Good. By thinking about the third sentence you knew that Danny went to K-Mart, so it doesn't make sense to talk about Sears. It makes more sense to say that while he was in K-Mart he found the shirt.

(If child doesn't identify error) Read the paragraph out loud and see if you can find anything that doesn't make sense. (HAVE CHILD READ) Think about all the sentences together. Does it make sense to say while he was in SEARS when we know he went to K-MART? No, it doesn't make sense. How could you change it? (PAUSE) Now the paragraph reads: (SHOW PARAGRAPH WITH CHANGE) does that make more sense?

The editor also showed me a list of "Thing to Do" which she uses as a reminder while editing. Let's review it together. (SHOW LIST TO CHILD)

1. Read each sentence—Does each sentence make sense?
2. As you read, look back to the other sentences—Does the story still make sense?
3. As you read, think about your own experiences and what you know about the world—Does the story still make sense?

Today, I have some more stories which I would like you to read. Each story has three parts. You may read them in whatever way you feel most comfortable, either silently to yourself or out loud. As you read each part, decide if it does or does not make sense. After you have read each part, I will ask you to check one of two boxes. (SHOW SAMPLE) One box says, "Everything makes sense"; the other box says, "Something does not make sense." I will also ask you whether you would make any change and if you would, to make the change on the story.

I'm going to leave this list of "Things to Do" here on the desk for you. Be sure to follow these steps while you read because they will help you understand what you read. Do you understand what you are going to do? (PAUSE) Good.

The instructions for the control group were the same as the general instructions for Experiment 1.

Following the instructions, both groups read a text-based and a reader-based inconsistent story and answered the questions following each part of the stories. The presentation order of the particular story and of the type of inconsistency was counterbalanced.

One week later both groups were seen again by the investigators. The treatment group received the same training as was used the previous week, except for the use of different examples. The control group received the same instructions as the previous week. Both groups then read another text-based and another reader-based inconsistent story and answered the questions following each part of the story.



## RESULTS

Each subject's responses were scored as they were for Experiment 1. Since the data from Experiment 1 indicated that readers' ability to detect text-based and reader-based inconsistencies differed, it seemed unnecessary to compare the two in the training experiment. Therefore, for Experiment 2, the reader-based data and the text-based data were analyzed separately.

For each set of data, a mixed analysis of variance with two levels of the treatment variable (between) and two levels of trials (within) was performed. For the reader-based data, the main effects were not significant. However, there was a significant treatment  $\times$  time of trial interaction,  $F(1, 22) = 16.88, p < .01$ . Tests of simple main effects were used to investigate the cause of the observed interaction. Although there were no differences between groups after the first training session, the scores of the treatment group after the second training session were significantly higher than those achieved by the control group,  $F(1, 22) = 10.53, p < .01$ . For the text-based data there were no significant results. Means and standard deviations for these data are presented in Table 1.

TABLE 1

Means and Standard Deviations of Text-Based and Reader-Based Inconsistencies Detected for the Control and Treatment Groups from Experiment 2

Subjects		Time 1		Time 2	
		RB	TB	RB	TB
Training, N = 24	$\bar{X}$	1.92	.58	2.33	.75
	S.D.	.86	.81	.85	.92
Control, N = 24	$\bar{X}$	1.83	.25	1.08	.42
	S.D.	1.21	.60	.95	.49

## DISCUSSION

The purpose of Experiment 1 was to determine whether poor comprehenders have equal difficulty detecting text-based and reader-based inconsistencies. Prior research indicates that poor readers have considerable difficulty detecting inconsistencies in text. However, subjects were generally required to detect text-based or detail inconsistencies in prior research. Poor comprehenders' performance suggested little, if any, ability to monitor their comprehension. However, the results of the present study suggest an alternative interpretation.

Most of the subjects demonstrated considerable difficulty with the text-based

task, replicating the results of previous studies. These same subjects, however, demonstrated moderate to good success with the reader-based stories (mean scores for the text-based and reader-based tasks were .50 and 1.30, respectively). An explanation for these results has been suggested in studies by Markman (1979) and Baker (1979, Note 1). They suggest that readers employ different standards to evaluate their understanding of text. The text-based inconsistencies included in the passages used in this study were similar to those in previous research. After careful examination, it was apparent that these inconsistencies were typically minor details which were not crucial for a general understanding of the stories. On the other hand, the reader-based inconsistencies were linked to the reader's knowledge of the world and to a general understanding of the stories. The directions for the task required the subjects to determine whether the passage made sense. These directions may have caused the subjects to try to gain a general or gist understanding of the passages. It appears that the subjects overlooked minor details and thus did quite poorly on the text-based task. On the other hand, the poor comprehenders demonstrated relative success with the reader-based task. In summary, results of this study suggest that poor comprehenders are able to demonstrate some level of comprehension monitoring skills when the standard they employ matches the task which they are asked to perform. In other words, poor comprehenders appear to evaluate their comprehension from a reader-based perspective, especially when the task requires them to "make sense" of their reading.

It should be remembered that experimental tasks in comprehension monitoring have attempted to induce monitoring behavior. Induced performance is quite different from spontaneous or routine usage. Nonetheless, induced usage may serve as an intermediate step for those who must first recognize, understand, and begin to use a particular strategy prior to its usage on a routine basis. Operating under this premise, the purpose of Experiment 2 was to determine whether direct training of comprehension monitoring skills would increase poor comprehenders' detection of reader-based and text-based inconsistencies.

While inspection of the text-based data following the experimental procedures revealed somewhat higher mean scores for the training group than for the control group, the scores of the two groups did not differ significantly. For the reader-based data, significant differences were observed following the second training session, indicating at least some success with the direct training procedures. Therefore, the mixed results suggest that the direct training procedures used in the experiment appear to have been of greater benefit for the detection of reader-based inconsistencies than for the detection of text-based inconsistencies.

Two training sessions presented one week apart appear to have been a more effective means to induce increased monitoring behavior than a single training session. However, further research is needed to determine the effects of direct instruction in comprehension monitoring presented over a greater number of sessions.

Finally, although the training sessions lasted approximately ten minutes, the procedures used in the training resembled legitimate teaching procedures which positively influence subjects' participation and performance. Incorporated into the training script was an introduction which was designed to motivate the subjects. This was followed by brief instruction and an example which elicited subject participation. After the subject completed the example, the investigator and the subject reviewed what had just been completed. This was repeated with a more complex example, and once again the investigator reviewed with the subject what had been done. Following the two examples, the investigator read and then handed to the subject a summary of the monitoring strategies which could be used for the experimental task.

In conclusion, new insights concerning poor comprehenders and future directions for research have been suggested by the present study. Poor comprehenders can be induced to use monitoring skills with direct instruction. Recognition of the standard these readers employ to evaluate their comprehension and of the type of material encompassing the task are two factors which need to be taken into consideration. It appears that minor details and unimportant facts may hinder beginning monitoring success for these readers. Researchers should continue to investigate the effects of direct training on self-monitoring strategies, and should also examine these effects for longer training sessions over greater periods of time. In addition, the research should examine procedures which transfer induced learned behaviors to more generalized and spontaneous performance.

## REFERENCE NOTES

1. BAKER, L. *Developmental differences in children's use of three standards for evaluating their comprehension*. Paper presented at the Southeastern Conference on Human Development, Baltimore, April 1982.
2. GARNER, R., & REIS, R. *Monitoring and resolving comprehension failure through text lookbacks*. Paper presented at the annual meeting of the National Reading Conference, Dallas, 1981.

## REFERENCES

- BAKER, L. Comprehension monitoring: Identifying and coping with text confusions. *Journal of Reading Behavior*, 1979, 11, 365-374.
- BAKER, L., & ANDERSON, R. I. Effects of inconsistent information on text processing: Evidence for comprehension monitoring. *Reading Research Quarterly*, 1982, 17, 281-293.
- BROWN, A. L., CAMPIONE, J. C., & DAY, J. Learning to learn: On training students to learn from texts. *Educational Researcher*, 1981, 10, 14-21.

- CAMPIONE, J. C., NITSCH, K., BRAY, N., & BROWN, A. L. *Improving memory skills in mentally retarded children: Empirical research and strategies for intervention* (Tech. Rep. No. 196). Urbana-Champaign: Center for the Study of Reading, University of Illinois, 1980.
- FRY, E. A readability formula that saves time. *Journal of Reading*, 1968, 11, 513-516, 575-578.
- GARNER, R. Monitoring of understanding: An investigation of good and poor readers' awareness of induced miscomprehension of text. *Journal of Reading Behavior*, 1980, 12, 55-64.
- GARNER, R. Monitoring of passage inconsistency among poor comprehenders: A preliminary test of the "piecemeal processing" explanation. *Journal of Educational Research*, 1981, 74, 159-162.
- GARNER, R., & KRAUS, C. Monitoring of understanding among seventh graders: An investigation of good comprehender-poor comprehender differences in knowing and regulating reading behaviors. *Educational Research Quarterly*, 1981-1982, 6, 5-12.
- GARNER, R., & TAYLOR, N. Monitoring of understanding: An investigation of attentional assistance. *Reading Psychology*, 1982, 3, 1-6.
- HANSEN, J., & PEARSON, P. D. *An instructional study: Improving the inferential comprehension of good and poor fourth-grade readers* (Tech. Rep. No. 235). Urbana-Champaign: Center for the Study of Reading, University of Illinois, 1982.
- KARLSEN, B., MADDEN, R., & GARDNER, E. *Stanford Diagnostic Reading Test*. New York: Harcourt, Brace, and Jovanovich, Inc., 1976.
- LOPER, A. B. Metacognitive development: Implications for cognitive training. *Exceptional Education Quarterly*, 1980, 1, 1-8.
- MARKMAN, E. Realizing that you don't understand: Elementary school children's awareness of inconsistencies. *Child Development*, 1979, 50, 643-655.
- MEICHENBAUM, D. Cognitive behavior modification with exceptional children: A promise yet unfulfilled. *Exceptional Education Quarterly*, 1980, 1, 83-88.
- MEICHENBAUM, D., & ASARNOW, J. Cognitive-behavioral modification and metacognitive development: Implications for the classroom. In P. Kendall & S. Hollon (Eds.), *Cognitive-behavioral interventions, theory, research, and procedures*. New York: Academic Press, 1979.
- PEARSON, P. D. *A context for instructional research on reading comprehension* (Tech. Rep. No. 230). Urbana-Champaign: Center for the Study of Reading, University of Illinois, 1982.
- WAGONER, S. Comprehension monitoring: What it is and what we know about it. *Reading Research Quarterly*, in press.
- WINOGRAD, P., & JOHNSTON, P. Comprehension monitoring and the error detection paradigm. *Journal of Reading Behavior*, 1982, 14, 61-76.