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ABSTRACT

A study conducted during a training program, in which students were learning to find main ideas, investigated how different kinds of strategy value information influenced children's reading comprehension. Subjects, 15 fourth-grade and 15 fifth-grade students who regularly received remedial reading comprehension instruction, were divided into three groups, who received (1) instructions to use a specific strategy and information on its benefits, (2) strategy effectiveness feedback linking their improved performances with their use of the strategy, and (3) both specific strategy information and strategy effectiveness feedback. A "self-efficacy" test was administered on a pretest/posttest basis to assess students' perceived capabilities for correctly answering different types of questions that tapped comprehension of main ideas. Results showed that the combined treatment enhanced self-efficacy and skill better than other conditions, which did not affect performance. These findings suggest that remedial readers may not benefit much from minimal information on how strategy use can improve performance. Rather, multiple sources of strategy value information may be necessary to enhance self-efficacy and comprehension skill. Results also suggest that the combined treatment engendered in children a sense of control over their comprehension performances and raised their self-efficacy. (A table of results and four pages of references are included.) (JD)

Strategy Value Information and Children's Reading Comprehension

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Abstract

This experiment investigated how providing remedial readers with information that strategy use improves performance influenced their self-efficacy and comprehension skill. During a training program on finding main ideas, students in one condition (specific strategy value) received information that strategy use would benefit them on that task, students in a second condition (strategy effectiveness feedback) were told that their improved performances were due to their use of the strategy, and those in a third condition (combined) received specific information plus feedback. The combined treatment enhanced self-efficacy and skill better than the other conditions, which did not differ. These results suggest that remedial readers may not benefit much from minimal information on how strategy use can improve performance. Multiple sources of strategy value information may be necessary to enhance self-efficacy and comprehension skill.

Strategy Value Information and Children's Reading Comprehension

Children's use of cognitive strategies, or systematic plans oriented toward improving performance, typically increases with age and task experience (Brown, 1980; Brown, Campione, & Day, 1981; Flavell, 1985; Myers & Paris, 1978). A strategic approach to reading comprehension includes activities such as understanding the task demands, monitoring one's level of comprehension, and taking corrective action (e.g., rereading) when failures are detected. Research shows that students with strategic deficiencies can benefit from explicit training on reading strategies (Paris, Cross, & Lipson, 1984; Raphael & McKinney, 1983).

At the same time, strategy training does not ensure that children will continue to use the strategy when no longer required to do so (Borkowski & Cavanaugh, 1979; Kramer & Engle, 1981). Failure to employ a strategy may result partly from the belief that, although the strategy is useful, it is not as important for success as are such factors as time available or effort expended (Fabricius & Hagen, 1984). To promote continued strategy use, researchers have suggested providing students with strategy value information, or information that strategy use can improve performance (Borkowski & Cavanaugh, 1979; Brown et al., 1981; Paris, Lipson, & Wixson, 1983). Some ways to convey strategy value are to instruct children to use the strategy because it will help them perform better, to inform them that strategy use benefited other students, and to provide them with feedback linking strategy use with their performance improvements (Borkowski & Cavanaugh, 1979; Brown, 1980; Schunk & Gunn, 1985). There is evidence that strategy value information can lead to greater strategy maintenance and better performance (Borkowski, Levers, & Gruenenfelder, 1976; Kennedy & Miller, 1976; Kramer & Engle, 1981;

Lodico, Ghatala, Levin, Pressley, & Bell, 1983; Paris, Newman, & McVey, 1982; Ringel & Springer, 1980).

The purpose of this study was to investigate how different forms of strategy value information influenced children's reading comprehension. The subjects, who regularly received remedial reading instruction, were given comprehension strategy training on finding main ideas. We also examined how strategy value information affected children's perceived self-efficacy, or personal beliefs about one's capabilities to organize and implement actions necessary to attain designated levels of performance (Bandura, 1982, 1986). Self-efficacy is hypothesized to affect one's choice of activities, effort expenditure, persistence, and achievement. Individuals acquire information about their self-efficacy through actual performances, vicarious experiences, forms of persuasion, and physiological indexes (e.g., sweating, heart rate).

Strategy value was conveyed to some students by instructing them to use the strategy and by informing them that strategy use benefited other similar students. It was predicted that providing such specific strategy information would enhance children's comprehension skills. We expected that children given strategy value information would be more likely to maintain their use of the strategy on the posttest when they were no longer required to use it (Borkowski et al., 1976; Kennedy & Miller, 1976; Paris et al., 1982; Ringel & Springer, 1980).

We also felt that this treatment would promote children's self-efficacy. Although poor readers often possess self-doubts about their reading capabilities (Butkowsky & Willows, 1980; Paris et al., 1983), strategy value information implicitly conveys to children that they are capable of successfully applying the strategy, which can engender a sense of control over

learning and raise self-efficacy (Bandura, 1982; Schunk, 1985). Further, information that strategy use benefited other students is a form of social comparison. Such vicarious information can raise self-efficacy for learning, because children are apt to believe that if other children could successfully apply a strategy, they can as well (Bandura, 1986; Goethals & Darley, 1977; Levine, 1983). High self-efficacy for learning, which is substantiated later as children work at the task and experience success, can lead to better comprehension performance (Schunk & Gunn, 1985).

To explore the effects of different forms of strategy value information, a second group of students was given strategy effectiveness feedback, or verbal feedback linking students' improved performances with their use of the strategy. We felt that such feedback might be an especially effective means of promoting self-efficacy and skills. Research shows that strategy effectiveness feedback enhances strategy maintenance and skills (Borkowski & Varnhagen, 1984; Kurtz & Borkowski, 1984; Ringel & Springer, 1980). Such feedback also conveys to students that they are capable of applying a strategy that improves their performances, which can raise self-efficacy for learning (Schunk, 1985).

We included a condition that combined strategy effectiveness feedback with specific strategy information. We felt that this combined treatment would provide children with the most comprehensive conditional knowledge, or knowledge about when and why a strategy might be useful (Paris et al., 1983, 1984). Brown and her colleagues view extensive awareness training on when and why a strategy can be useful as an integral component of successful cognitive-skills training programs (Baker & Brown, 1984; Brown, Palincsar, & Armbruster, 1984). It seemed possible that our remedial reader subjects would

be more likely to continue to use the strategy when given multiple sources of strategy value information than they would when provided with only a single source of information. To the extent that the combined treatment also instilled in children a more generalized sense of control over reading comprehension activities, we felt that the combined condition would lead to the highest self-efficacy.

Method

Subjects

The final sample comprised 30 students (15 fourth graders, 15 fifth graders) drawn from one elementary school. The 15 boys and 15 girls ranged in age from 9 years 7 months to 13 years 1 months (M = 11.0 years). Although different socioeconomic backgrounds were represented, children predominantly were lower-middle class. Ethnic composition of the sample was as follows: 37% Hispanic, 27% black, 26% white, 10% Asian. Teachers initially nominated 35 children for participation; three students were excluded because they missed the training sessions, and two were randomly excluded from the appropriate cells to equalize the cell sizes.

Subjects regularly received remedial reading comprehension instruction. Students had been placed in remedial classes by the school district because they scored at or below the 20th percentile on the reading subtest of the SRA Achievement Series (Naslund, Thorpe, & Lefever, 1978). Twenty students were in their first year of being enrolled in the remedial program, seven were in their second year, and three were in their third year. Approximately 25% of the sample also received some instruction in English as a second language classes.

Pretest

The pretest was administered to children individually by one of two female adult testers drawn from outside the school. Testers followed a standardized set of instructions. The self-efficacy test assessed children's perceived capabilities for correctly answering different types of questions that tapped comprehension of main ideas. For this assessment, 20 scales were portrayed on four sheets of paper. Each scale ranged in 10-unit intervals from not sure (10), through intermediate values (50-60), to really sure (100).

The reading materials included eight passages drawn from books A, B, and C, of Scoring high in reading (Cohen & Foreman, 1978). Passages ranged from 4 to 25 sentences, and each passage was followed by one to four questions (e.g., "What is the first paragraph mostly about?", "What is the most important idea in this story?", "What is the narrator's main feeling?", "What is a good title for this passage?") for a total of 20 questions. According to Cohen and Foreman, four passages (nine questions) were appropriate for grade two students of average reading ability (book A), two passages (six questions) for grade three students (book B), and two passages (five questions) for grade four students (book C). Passages and questions corresponded in reading level to those on the ensuing skill test although they were not identical. The reliability of the efficacy measure was assessed separately with 12 comparable children who did not participate in the actual study. The test-retest reliability coefficient was .82.

Children initially received practice with the self-efficacy scale by judging their certainty of successfully jumping progressively longer distances. In this concrete fashion, children learned the meaning of the scale's direction and the different numerical values. Following this

practice, children read each of the eight passages. After children read each passage, the tester read its questions one at a time. For each question, students privately judged their certainty of answering correctly questions of that type; children judged their capability of answering different types of questions rather than whether they could answer particular questions. Students were not allowed to consult passages and questions did not appear on their test pages to preclude them from actually answering the questions. Children were advised to be honest and mark the efficacy value that matched how they really felt. The 20 efficacy judgments were summed and averaged.

The comprehension skill test, which was administered immediately following the efficacy assessment, comprised 8 passages with 20 questions. Passages and questions were drawn from Scoring high in reading (Cohen & Foreman, 1978) and ranged in difficulty as described above. Two different forms of the skill test were developed. These parallel forms were used on the pretest and posttest to eliminate potential effects due to passage familiarity. Reliability was assessed during the pilot study; children's scores on these parallel forms correlated highly (r = .87).

The tester presented children with each passage, along with its one or more multiple choice questions, one at a time. After children read each passage, they answered its questions without assistance or performance feedback. The measure of comprehension skill was the number of questions answered correctly.

Instructional Program

Following the pretest, children were assigned randomly within sex and grade level to one of three experimental conditions (n = 10 per condition): specific strategy value, strategy effectiveness feedback, strategy value plus

sessions over 15 consecutive school days, during which they worked on an instructional packet. Children assigned to the same experimental condition met in groups of 5-6 with one of two female adult trainers drawn from outside the school. Each trainer worked with equal numbers of children assigned to the three experimental conditions. Prior to the start of the study, trainers received instruction on the training procedures from the authors and practiced the procedures on a small group of students who did not participate in the actual study.

The instructional material consisted of a training packet that included several reading passages, each of which was followed by one or more multiple-choice questions tapping comprehension of main ideas. The passages in the packet were drawn from different sources and were similar to those typically used by children's remedial teachers. The reading passages were ordered from least-to-most difficult; 40% of the material was appropriate for a second grade class of average reading ability, 40% for a third grade class, and 20% for a fourth grade class. Children worked on this packet during each of the training sessions.

At the start of the first training session, the trainer distributed the instructional packet. On a nearby poster board was printed a five-step reading comprehension strategy, which was developed in previous research (Schunk & Rice, 1986). This five-step strategy was as follows:

> What do I have to do? (1) Read the questions. (2) Read the passage to find out what it is mostly about. (3) Think about what the details have in common. (4) Think about what would make a good title. (5) Reread the story if I don't know the answer to a question.

and gave the appropriate treatment instructions (described below). The trainer then modeled the strategy and its application by verbalizing, "What do I have to do? Read the questions." The trainer read aloud the multiple-choice questions for the first comprehension passage while children followed along, after which she pointed to and verbalized steps (2) and (3). The trainer explained that details referred to bits of information and gave some examples, and said that while she was reading the passage she would be thinking about what the details had in common. She then read the passage aloud. The trainer pointed to and verbalized step (4), and explained that trying to think of a good title helps to remember important ideas in a story. She stated some of the details in the story, explained what they had in common, and made up a title for the story. The trainer then read aloud the first question and its multiple choice answers, selected the correct answer, and explained her selection by referring to the passage. She answered the remaining questions in the same fashion.

Following this modeled demonstration, the trainer instructed children to repeat aloud each step after she verbalized it. She then said, "What do I have to do? Read the questions." After children verbalized these statements, she selected one student to read the questions aloud. When this child finished, the trainer instructed children to repeat after her steps (2) and (3). The trainer then called on a different child to read the passage aloud, after which she asked children to repeat step (4) after her. A third student was selected to think of a title for the story and explain his or her answer. The trainer then called on individual children to read aloud each of the questions with its answers and to answer that question. If a child answered a

passage to answer the question correctly. [illegible] while reading the trainer prompted with contextual and phonetic cues.

The training format for the remainder of the first session and the rest of the training program was identical except that the trainer did not model strategies and children did not verbalize each step prior to applying it. Instead, she referred to steps at the appropriate places and occasionally asked children to verbalize them. The training procedure was scripted to insure standardized implementation. Occasional observations by the authors confirmed that it was properly implemented. During the experiment, children did not receive comprehension instruction in their classes.

Experimental Conditions

For children assigned to the specific strategy value condition, the trainer pointed to the poster board at the start of each session and said, "Today we're going to use these steps to answer questions about main ideas." She then delivered strategy value information as follows:

> Using these steps should help you whenever you have to answer questions about main ideas, because most children like you find that using these steps helps them whenever they have to answer questions about main ideas.

At the end of each training session, the trainer re-emphasized the value of the strategy by remarking, "Remember that using these steps should help you whenever you have to answer questions about main ideas."

Each child assigned to the strategy effectiveness feedback condition received strategy effectiveness feedback from the trainer 3-4 times during each training session. This feedback, which linked children's successes at

answering comprehension questions with their proper application of the steps in the strategy, was verbally delivered by the trainer after the trainer provided performance feedback. Sample strategy effectiveness feedback statements are as follows:

"You got it right because you followed the steps in the right order."

"Answering questions is easier when you follow these steps."

"You've been answering a lot more questions correctly since you've been using these steps."

"Do you see how thinking about what the details have in common helps you to answer questions?"

"Since you've been thinking about what would make a good title you've been answering a lot more questions correctly."

Children assigned to the specific plus feedback (combined) condition received both of the preceding treatments. They were given the strategy value information at the start and end of each session, and the strategy effectiveness feedback periodically during each training session.

Posttest

Children were administered the posttest on the day following the last training session. For any given child, the tester was unaware of the child's experimental assignment and of how the child had performed during the training program. The self-efficacy and skill instruments and procedures were identical to those of the pretest except that the parallel form of the skill test was used. Tests and training materials were scored by an adult who had not participated in the data collection and was unaware of children's experimental assignments. The reading comprehension skill tests were scored using the answers provided in the source material (Cohen & Foreman, 1978).

Results

Means and standard deviations are shown in Table 1. Preliminary ANOVAs yielded no significant between-conditions differences on pretest self-efficacy or skill. There also were no significant differences on any measure due to tester, grade level, or sex of child, and experimental conditions did not differ in the number of reading passages completed during the training program.

Insert Table 1 about here

Pretest to posttest changes on self-efficacy and skill were evaluated using the t test for correlated scores. These analyses revealed that students in the specific strategy value condition made a significant improvement in comprehension skill ($p < .05$), and that subjects in the combined condition showed significant gains in self-efficacy and skill ($ps < .01$).

Tests of slope differences for each measure yielded homogeneity of slopes across the three treatment conditions ($ps > .05$). Posttest self-efficacy and skill were analyzed with MANCOVA using the corresponding pretest measures as covariates. The three experimental conditions constituted the treatment factor. This analysis was significant, Wilks's lambda = .387, $F(4, 48) = 7.28$, $p < .001$. ANCOVA applied to posttest self-efficacy yielded a significant between-conditions difference, $F(2, 26) = 9.20$, $p < .01$ ($MS_e = 112.993$). Dunn's multiple comparison procedure showed that subjects in the combined condition judged self-efficacy significantly higher than did subjects in the strategy effectiveness feedback ($p < .01$) and strategy value ($p < .05$) conditions, which did not differ significantly.

Posttest skill also was analyzed with ANCOVA and yielded a significant between-conditions difference, $F(2, 26) = 14.65$, $p < .001$ ($MS_e = 7.005$). Dunn's procedure revealed that the combined condition demonstrated significantly higher posttest comprehension skill than each of the other two conditions ($ps < .01$); the latter two conditions did not differ significantly.

Product-moment correlations were computed to gain information on the relationship of theoretically relevant variables. Correlations initially were computed separately within each experimental condition, and were pooled across conditions because there were no significant between-conditions differences. The only significant correlation was between posttest self-efficacy and posttest skill ($r = .53$, $p < .01$).

Discussion

The results of this study support the idea that providing children with multiple sources of strategy value information can have important effects on their self-efficacy and comprehension skill. Our findings cannot be due to differences in reading instruction, because children in each experimental condition received the same amount and type of instruction and practice in applying the strategy. Experimental conditions also did not differ in the number of passages completed during training.

As Brown as her colleagues emphasize, cognitive-skills training needs to include instruction and practice in applying a strategy, training in self-regulated implementation and monitoring of strategy use, and information on strategy value and on the range of tasks to which the strategy can be applied (Baker & Brown, 1984; Brown et al., 1981, 1984). Poor readers often lack conditional knowledge concerning when and why to apply reading strategies (Myers & Paris, 1978; Paris et al., 1983, 1984). Such students may not

benefit much from minimal information indicating that strategy use improves performance.

Although this study shows that multiple sources of strategy value information enhance remedial readers' self-efficacy and comprehension, it does not specify the process by which these effects occur. The combined treatment presented students with the most complete set of influences on reading comprehension, because this treatment integrated strategy training with multiple sources of strategy value information. It is possible that these subjects were more likely to use the strategy on the posttest when no longer required to employ it. Children often have naive ideas about when a strategy may be useful (Fabricius & Hagen, 1984; Myers & Paris, 1978). Providing remedial readers with only one source of strategy value information may not be adequate to convince them to continue using the strategy following training. Future research might examine the extent to which students employ strategies under test conditions. Additional work also is needed on how well students maintain their use of strategies over longer periods of time. There is some evidence that strategy value information can lead to better strategy maintenance (Borkowski & Cavanaugh, 1979).

It also is possible that the combined treatment engendered in children a sense of control over their comprehension performances, which can raise self-efficacy (Bandura, 1982). Becoming a strategic reader requires combining skills with positive beliefs (Paris et al., 1983). The belief among children that they were capable of performing well likely was validated during training as they applied the strategy and successfully answered questions (Schunk, 1985). In turn, higher self-efficacy can lead to better posttest performance.

Additional research is needed on the effects of various types of strategy effectiveness feedback. The feedback given stressed children's use of a comprehension strategy. Effort attributional feedback (e.g., "You got it right because you worked hard") links children's successes with increased effort. Such feedback can promote students' achievement and perceptions of their capabilities, and is especially useful with children possessing learning problems (Licht & Kistner, 1986).

The results of this study should not imply that strategy value information can be conveyed to children only through verbal instructions and feedback. Training procedures that require extensive cognitive activity by learners can simultaneously teach them to self-regulate their performances and convey information about the usefulness of a strategy (Borkowski & Cavanaugh, 1979). For example, a procedure that can highlight the link between strategy use and improved performance is self-instructional training, which comprises modeling, guided practice, faded self-guidance (i.e., students' verbalizations are faded to whispers), and covert (silent) self-instruction (Borkowski & Varnhagen, 1984; Harris, 1982; Kendall & Wilcox, 1980; Meichenbaum & Asarnow, 1979; Schleser, Meyers, & Cohen, 1981). Self-instructional training can assist poor readers to actively monitor their level of comprehension, which can lead to better strategy maintenance (Borkowski & Cavanaugh, 1979; Meichenbaum & Asarnow, 1979). The high level of cognitive activity inherent in self-instructional training promotes strategy coding, retention, and retrieval, and fosters positive beliefs about learning (Harris, 1982; Meichenbaum & Asarnow, 1979).

Another way to convey strategy value information is to train students on multiple tasks (Borkowski & Cavanaugh, 1979). As part of such training,

students will need instruction on how to transform the strategy so that it applies to the various tasks, because even minor strategy modification is problematic among children with cognitive deficits (Borkowski & Cavanaugh, 1979). Training students on different tasks not only provides multiple sources of strategy value information but also helps to promote strategy generalization. In contrast, training on only one task may engender the belief among children that the strategy has limited applicability.

This research supports the idea that although self-efficacy is influenced by one's performances, it is not merely a reflection of them (Bandura, 1982; Schunk, 1985). Experimental conditions did not differ in the number of comprehension exercises completed during training but children who received multiple sources of strategy value information subsequently judged self-efficacy higher. This finding is not surprising. The belief that one can effectively apply a strategy that will improve one's reading comprehension can raise self-efficacy (Schunk, 1985).

This research has implications for classroom practice. Small group remedial reading instruction is common in schools, and strategy training can easily be incorporated into regular comprehension instruction. At the same time, teachers need to provide students with conditional knowledge concerning when and why a strategy may benefit their performance. The present study suggests that remedial readers may not benefit much from minimal strategy value information. Whether derived from teacher feedback or from training procedures themselves, multiple sources of strategy value information are likely to promote children's comprehension skills and self-efficacy for applying them.

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Table 1

Means (and Standard Deviations)

Measure	Phase	Experimental Condition		
		Specific	Feedback	Combined
Self-Efficacy	Pretest	63.9 (8.9)	59.5 (14.5)	61.5 (8.7)
	Posttest	70.3 (14.6)	64.5 (9.2)	84.6 (8.8)
Skill	Pretest	4.5 (2.0)	5.9 (2.3)	5.5 (1.5)
	Posttest	8.1 (2.6)	7.7 (3.1)	13.5 (2.3)

Note. $N = 30$; $n = 10$ per condition.