ENHANCING COMPREHENSION SKILL AND SELF-EFFICACY WITH STRATEGY VALUE INFORMATION

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Abstract:
Two experiments investigated how providing remedial readers with information that strategy use improves performance influenced their self-efficacy and comprehension skill. In both studies, children were given training on finding main ideas, Children in Experiment received specific strategy value information, general strategy value information, specific plus general (combined) information, or no strategy value information. In Experiment 2, children received strategy effectiveness feedback, specific strategy value information, or feedback plus specific (combined) information. In each study, 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.

Article:
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 the present two studies was to investigate how 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).

In Experiment 1, strategy value was conveyed by instructing children to use the strategy and by informing them that strategy use benefited other similar students. It was predicted that providing strategy value 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 strategy value information 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).

Within this context, we investigated whether emphasizing the specific or the general usefulness of the strategy differentially affected skill and self-efficacy. A specific strategy aids performance on the task at hand; a general strategy can benefit performance on several related tasks (Harris, 1982; Kendall & Finch, 1979; Kendall & Wilcox, 1980; Meichenbaum & Asarnow, 1979). We expected comparable effects on self-efficacy and skill from these two treatments, because research shows that training students to use specific or general strategies can benefit performance (Kendall & Finch, 1979; Schleser, Meyers, & Cohen, 1981). Further, the belief that one can apply a strategy that will promote comprehension performance, either on the task at hand or on related tasks, ought to provide children with a sense of control over learning outcomes and raise self-efficacy (Schunk, 1985).

We included a condition in which children received strategy value information emphasizing both the specific and the general usefulness of the strategy. 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 [ruining* 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.

EXPERIMENT 1

Method

Subjects. The final sample comprised 40 students (20 fourth graders, 20 fifth graders) drawn from two elementary schools. The 21 boys and 19 girls ranged in age from 9 years 7 months to 13 years 2 months (M = 11.2 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 43 children for participation; two students were excluded because they missed the training sessions, and one was randomly excluded from the appropriate cell 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-five students (60% of the sample) were in their first year of being enrolled in the remedial program, eleven students (30%) were in their second year, and four students (10%) were in their third year. Approximately 25% of the sample also received some instruction in English as a second language class.

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, tour 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. Sample passages and questions are found in Figures 1, 2, and 3.

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.

Billions and billions of years ago there were no people. There were no animals. There were no trees or flowers. Our earth was made of gases and stardust. It was a huge ball of fire. No one is sure how this fire began. But it burned all the time. The earth kept on burning inside. But after billions of years the outside began to cool off. It started to crack. Boiling mud and hot rock gushed out. Clouds of steam hung over the earth. The clouds turned to rain. Water was everywhere. Now life on earth could begin.

What is the most important idea in this story?
A. Earth was made of gases and stardust.
B. Earth was once very hot.
C. The earth cooled slowly.
D. Earth's surface cracked as it cooled.

Figure 1. Sample Passage Book A

The gorilla's life is not always quiet. Sometimes the father gorilla does a very strange thing. In a way it is a kind of dance. First he makes a soft hooting noise. Then he picks a leaf and holds it in his lips. He stands up high on his back legs. He hoots faster. He throws leaves in the air. He hits his great chest so hard the noise can be heard far away. He kicks one leg in the air. He runs sideways. He rips leaves and branches off trees. Then, to end it all, he hits the ground with his mighty hand.

What is this story mainly about?
A. How the father gorilla rips up trees.
B. A strange dance of the father gorilla.
C. The life of the father gorilla.
D. How a father gorilla makes a hooting noise.

Figure 2. Sample Passage Book B

Airports are often busy. Then, it is important for the air controllers to keep track of all the planes circling overhead, waiting for a break in the traffic so that they can land. Many times three or four planes circle the city at the same altitude. This situation leads to increased pressure for the air traffic controllers.

What is the main idea of this paragraph?
A. Flying airplanes.
B. Air traffic control.
C. Landing an airplane.
D. Using runways.

Figure 3. Sample Passage Book C

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, grade level, and school, to one of four experimental conditions (n = 10 per condition): specific strategy value information, general strategy value information, specific plus general (combined) strategy value information, no strategy value information (instructional control). All students received 35-minute training sessions over 15 consecutive schooldays, 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 four 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?(I) 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 1 don't know the answer to a question.

After distributing the packet, the trainer pointed to the poster board 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 It-lade 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 question incorrectly, the student repeated step (5) and reread enough of the passage to answer the question correctly. When students stumbled on a word 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 ensure 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. Strategy value information was provided to children at the beginning and end of each training session, 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 info 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 reemphasized the value of the strategy by remarking, "Remember that using these steps should help von whenever you have to answer questions about main ideas."

For *general strategy value* children, the trainer introduced the steps at the start of each session in the same fashion (i.e., "Today we're going . . "), after which she provided the following strategy value information:

> Using steps like these should help you whenever you have to answer question, about passages you've read, because most children like you find that using steps like these helps them whenever they have to answer questions about passages they've read.

At the end of each training session, the trainer again stressed the general value of strategy use by remarking, "Remember that using steps like these should help you whenever you have to answer questions about passages you've read."

Students assigned to the *specific plus general strategy value* (combined) condition received both of the preceding sets of instructions. At the start and end of each training session, the trainer first provided; the specific value information, followed by the general value information.

For the *instructional control* (no strategy value) subjects, the trainer pointed to the poster board at the start of each training session and verbalized only the introductory statement. Children then received the training program. This condition controlled for the effects of strategy training and practice.

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

Pretest and posttest means and standard deviations are presented by experimental condition in Table 1. Preliminary analyses of variance (ANOVAs) yielded no significant between-conditions differences on pretest measures. There also were no significant differences on any measure due to tester, school, grade level, or sex of child. The four experimental conditions did not differ in the number of passages completed during the training program.

Table 1

Means (and Standard Deviations)—Experiment 1

Measure	Phase	Experimental Condition: Specific	General	Combined	Control
Self-efficacy	Pretest	58.2 (17.0)	66.7 (13.0)	64.0 (11.2)	69.6 (11.1)
	Posttest	73.9 (17.3)	73.8 (11.5)	90.7 (7.7)	71.6 (8.9)
Skill	Pretest	4.5 (2.7)	4.5 (2.8)	4.9 (1.9)	4.3 (2.2)
	Posttest	6.3 (3.1)	6.2 (4.9)	11.2 (4.9)	6.3 (2.5)

Note. $N = 40$; $n = 10$ per condition. Self-efficacy means represent the average judgment per question; range of scale is 10 (low)–100. Skill means represent the number of correct answers on 20 questions.

Intracondition changes (pretest to posttest) on self-efficacy and skill were evaluated using the *t* test for correlated scores (Winer, 1971). These analyses revealed that students in the specific condition made a significant improvement in self-efficacy ($p < .05$), and that subjects in the combined condition showed significant gains in comprehension self-efficacy and skill ($ps < .01$).

Analysis of covariance (ANCOVA) procedures were used to determine whether there were significant between-conditions differences on the posttest measures of self-efficacy and skill. The use of ANCOVA necessitated homogeneity of slopes across experimental conditions (Pedhazur, 1982), Tests of slope differences for each measure were made by comparing a linear model that allowed separate slopes for each experimental condition against one that had only one slope parameter for estimating the pretest-posttest relationship across the four treatments. These analyses found the assumption of slope homogeneity across treatments to be tenable ($ps > .05$).

Posttest self-efficacy and skill were analyzed with a 2 (specific value: given-not given) × 2 (general value: given-not given) multivariate analysis of covariance (MANCOVA) using the corresponding pretest measures

as covariates. This analysis yielded significant main effects for specific value, Wilks's lambda = .762, $F(2, 33) = 5.16$, $p < .05$, and for general value, lambda = .784, $F(2, 33) = 4.56$, $p < .05$, as well as a significant Specific × General interaction, lambda = .821, $F(2,33) = 3.60$, $p < .05$.

ANCOVA applied to posttest self-efficacy revealed significant main effects for specific value, $F(1, 35) = 7.97$,p < .01, and for general value, $F(1, 35) = 5,90$, $p < .05$ ($MS_e = 142.48$); however, the Specific × General interaction was nonsignificant ($p = .095$). Posttest means were evaluated using Dunn's multiple comparison procedure (Kirk, 1982). These analyses showed that students in the combined condition judged self-efficacy significantly higher than did students in the specific ($p < .05$), general ($p < .05$), and control ($p < .01$) conditions. The latter three conditions did not differ significantly.

The measure of posttest skill was analyzed with ANCOVA and yielded significant main effects for specific value, $F(1, 35) = 6.95$, $p < .05$, and for general value, $F(1, 35) = 6.50$, $p < .05$, as well as a significant Specific × General interaction, $F(1, 35) = 7 .35$, $p <$,05 ($MS_e = 13.17$). Dunn's procedure showed that the combined condition demonstrated significantly higher comprehension skill than the other three conditions (ps < .05), which did not differ significantly.

Correlational analyses were conducted to gain information on the relationship of theoretically relevant variables. Pearson product-moment correlations were computed separately within each of the four experimental conditions. The between-conditions differences in these correlations were nonsignificant; therefore, correlations were averaged across the four conditions using an *r* to *z* transformation (Edwards, 1984). Significant correlations were obtained between pretest self-efficacy and skill ($r = .48$, $p < .01$) and between posttest self-efficacy and skill ($r = .56$, $p < .01$).

EXPERIMENT 2

The results of Experiment 1 showed that providing remedial readers with multiple sources of strategy value information enhanced their self-efficacy and comprehension skill more than did providing a single source. In contrast, providing either specific or general strategy value information yielded no benefits over the effects due to participation in the instructional program (instructional control condition). It is possible that students assigned to the specific or general strategy value conditions failed to use the strategy on the posttest. It also is possible that these treatments did not engender in students a sense of control over learning outcomes, which would not have raised in self-efficacy. Remedial readers may not benefit much from minimal information indicating that strategy use improves performance.

Experiment 2 was conducted to further explore the role of strategy value information. Another means of conveying strategy value is to deliver *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).

In the second experiment, we compared the effects of strategy effectiveness feedback with those due to providing specific strategy value information. We used the latter treatment as a comparison condition because it, as well as the strategy effectiveness feedback treatment, focused on the application of the strategy to the task at hand (finding main ideas). We felt that the strategy effectiveness feedback treatment would be highly effective with remedial readers. Strategy effectiveness feedback provides students with clear evidence that strategy use improves their performances. In contrast, simply telling students that strategy use can improve their performances provides weaker evidence for strategy value.

We also included a condition that combined strategy effectiveness feedback with specific strategy value information. Based on the preceding considerations, we felt that this combined treatment would convey to

students a greater sense of control over learning outcomes and enhance the likelihood that they would continue to use the strategy. We hypothesized, therefore, that the combined treatment would promote self-efficacy and comprehension skill better than either treatment alone.

Method

Subjects. The subjects were 15 boys and 15 girls drawn from one elementary school. Eight boys and seven girls were fourth graders; the remaining children were in the fifth grade. Children ranged in age from 9 years 7 months to 13 years 1 month (M = 11.0 years). Subject selection procedures were identical to those of Experiment 1. All subjects were enrolled in remedial reading classes. Of the 30 subjects, 20 were in their first year of enrollment in remedial classes, seven were in their second year of enrollment, and three students were in their third year. Teachers initially nominated 35 children; three children missed some sessions due to illness, and two others were randomly excluded to equalize cell sizes.

Materials and procedure. The same materials and procedure of Experiment I were employed with the following modifications. Following pretesting, children were randomly assigned within grade level and sex to one of three treatment conditions: specific strategy value, strategy effectiveness feedback, strategy value plus effectiveness feedback (combined). Treatment conditions were differentiated according to the type of strategy value information provided during training. The *specific strategy value* condition was identical to that of Experiment 1. The trainer verbally delivered the information to children at the start and end of each session. During training, these children received performance feedback following their answers to the comprehension questions (e.g., "That's correct').

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 answer questions?
>
> Since you've been thinking about what would make a good title you've 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.

Results

Means and standard deviations are shown in Table 2. 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.

Pretest to posttest changes on self-efficacy and skill were evaluated using t he *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).

Table 2

Means (and Standard Deviations)—Experiment 2

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. See Table 1 for description of measures.

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 in the same fashion as in Experiment 1. They were pooled across conditions because there were no significant between-conditions differences. The only significant correlation was between posttest self-efficacy and posttest skill ($r = .53$, $p < .01$).

GENERAL DISCUSSION

The results of these studies 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 leading 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 and 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 these two studies show that multiple sources of strategy value information enhance remedial readers' self-efficacy and comprehension, they do not specify the process by which these effects occur. The combined treatments in each study presented students with the most complete set of influences on reading comprehension, because these treatments 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. 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 treatments 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.

Experiment 1 showed that emphasizing to children either the specific or the general usefulness of the strategy led to no benefits compared with those obtained from receiving training. This result seems surprising given much evidence that strategy value information enhances performance on cognitive tasks (Borkowski et al., 1976; Kennedy & Miller, 1976; Kramer & Engle, 1981; Lodico et al., 1983; Paris et al., 1982; Schunk & Gunn, 1985). Students assigned to either of these two conditions may have believed that the strategy was of limited usefulness and that other factors (e.g., time available, passage difficulty) had greater effects on reading comprehension. Children often have naive ideas about when a strategy may be useful (Fabricius & Hagen, 1984; Myers & Paris, (978). 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. Both the specific and general strategy value treatments were subtle; to be of benefit with remedial readers, such information may need to be provided to students repeatedly during each training session. Future strategy training research needs to assess children perceptions of strategy usefulness.

In Experiment 2, we found that strategy effectiveness feedback affected children's self-efficacy and comprehension as well as did providing specific strategy value information. Experiment 2 lends further support to the idea that reined readers benefit more from receiving multiple sources of strategy value information than they do from receiving only one source. As in Experiment 1, the extent to which these benefits derive from better strategy maintenance or from heightened self-efficacy remains an issue for future research.

Additional research is needed on the effects of various types of strategy effectiveness feedback. The feedback given in Experiment 2 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 it is especially useful with children possessing learning problems (Licht & Kistner, 1986).

The results of these studies should not imply that strategy value information can be conveyed to children only through verbal instructions and feedback. r raining 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 et al., 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,)982; 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 study also shows that self-efficacy bears a positive relationship to comprehension performance. Personal expectations for success are viewed as important influences on achievement by different theoretical approaches (Bandura, 1982; Corno & Mandinach, 1983; Covington & Beery, 1976; Schunk, 1985; Weiner, 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 studies suggest 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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