Goals and Progress Feedback: Effects on Self-Efficacy and Writing Achievement

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Abstract:

Two experiments investigated how goal setting and progress feedback affect self-efficacy and writing achievement. Children received writing strategy instruction and were given a process goal of learning the strategy, a product goal of writing paragraphs, or a general goal of working productively. Half of the process goal children periodically received feedback on their progress in learning the strategy. In Experiment 2 we also explored transfer (maintenance and generalization) of achievement outcomes. The process goal with progress feedback treatment had the greatest impact on achievement outcomes to include maintenance and generalization; the process goal without feedback condition resulted in some benefits compared with the product and general goal conditions. Self-efficacy was highly predictive of writing skill and strategy use. Suggestions for future research and implications for classroom practice are discussed.

Article:

The purpose of the present investigation was to explore the effects on children's achievement outcomes of process and product goals and goal progress feedback during writing instruction. The conceptual basis of this research was goal setting theory and research, which shows that goal setting promotes motivation and learning (Bandura, 1986; Locke & Latham, 1990). The effects of goals are not automatic, however, but rather depend on goal properties: specificity, proximity, difficulty. Goals that denote specific performance standards, are temporally close at hand, or are viewed as difficult but attainable, enhance performance better than goals that are general (e.g., "Do your best"), temporally distant, or perceived as very easy or very difficult, respectively (Schunk, 1990).

Bandura (1986, 1988) discussed how the effects of goals also depend on *self-efficacy,* or beliefs about one's capabilities to perform actions at designated levels. Self-efficacy is hypothesized to affect choice of activities, effort, and persistence. Individuals acquire efficacy information from their performances, vicarious (observational) experiences, forms of persuasion, and physiological indexes (e.g., sweating, heart rate). Research shows that when students adopt a goal they experience a sense of efficacy for attaining it (Schunk, 1990). Self-efficacy is substantiated as they work on the task and observe goal progress because progress conveys they are becoming skillful (Bandura, 1986; Locke & Latham, 1990).

Goal setting research has focused on such *product* goals as rate or quantity of work. In contrast, *process* goals involve techniques and strategies students use to learn (Weinstein & Mayer, 1986). One type of process goal is to acquire a *learning strategy,* or systematic plan for improving information processing and task performance. Research shows that students taught strategies typically improve their skills (Borkowski, Johnston, & Reid, 1987; Pressley, Woloshyn, Lysynchuk, Martin, Wood, & Willoughby, 1990), and that use of effective strategies correlates positively with self-efficacy (Pintrich & De Groot, 1990; Zimmerman & Martinez-Pons, 1990).

The present studies were designed to contribute to the goal setting and self-efficacy literatures because research has not examined the joint operation of these processes during children's writing. Theory and related research, however, substantiate the appropriateness of these studies. Contemporary theories view writing as a problem-

solving process that reflects goal-directed behaviors (Flower & Hayes, 1981; Scardamalia & Bereiter, 1986). Writers generate goals and alter them as they compose. Learners who feel competent about writing should be more likely to choose to write, expend effort, and persist at writing tasks than students who doubt their capabilities. Studies with adults show that self-efficacy for writing predicts achievement (Meier, McCarthy, & Schmeck, 1984; Shell, Murphy, & Bruning, 1989).

With children, Graham and Harris (1989a,b) found that teaching learning disabled students a strategy for writing essays or stories improved self-efficacy and writing and that skills and strategy use were maintained following training and generalized to other content and settings. Schunk and Rice (1989) taught remedial readers a comprehension strategy to find main ideas. Compared with control subjects given a general goal of working productively, children who received a process goal (learning to use the strategy) or a product goal (answering comprehension questions) judged self-efficacy higher. Process goal students demonstrated higher comprehension skill than the controls, but the process and product conditions did not differ. These goal conditions shared beneficial properties (specific, short-term, moderately difficult) and process-goal subjects may have focused on answering questions rather than on how well they were learning the strategy because they had difficulty attending to both outcomes.

In the present studies, we predicted that a process goal of learning a writing strategy would promote achievement outcomes better than a product goal of writing paragraphs and a general goal of working productively. Although the process and product goals were comparable in specificity, proximity, and difficulty, the process goal was expected to highlight strategy use as a means to improve writing. Students who believe they are learning a useful strategy experience greater control over learning and self-efficacy for skill improvement (Bandura, 1986; Schunk, 1989). Perceived strategy usefulness can motivate students to apply the strategy, which promotes skill acquisition (Baker & Brown, 1984; Borkowski, 1985). Compared with Schunk and Rice's (1989) remedial readers, we felt that our subjects, who had average writing skills, could focus on their progress in learning the strategy and on how the strategy was improving their writing. In contrast, a goal of writing paragraphs or a general goal may not convey that the strategy is important. Learners who believe a strategy does not contribute much do not employ it systematically or feel confident about learning (Borkowski et al., 1987; Paris et al., 1982).

According to goal setting theory (Locke & Latham, 1990), goal progress feedback informs individuals about how to attain their goals and motivates them to work on the task by denoting progress and conveying that goals are attainable. Self-efficacy theory postulates that goal progress feedback, as a persuasive form of self-efficacy information, raises self-efficacy by suggesting that individuals are competent and can continue to learn (Bandura, 1986).

Goal progress feedback also provides *strategy value information* about the usefulness of the strategy (Paris, Lipson, & Wixson, 1983; Pressley et al., 1990). Teaching students a strategy does not ensure they will use it. They may believe that the strategy is not as important for success as such factors as time available or effort expended. From a self-efficacy perspective, strategy value feedback may lead learners to believe they are learning a useful strategy, which raises self-efficacy and motivates them to continue applying it (Schunk, 1989). Strategy feedback promotes achievement outcomes and strategy use better than strategy instruction alone (Borkowski, Weyhing, & Carr, 1988; Kurtz & Borkowski, 1987; Paris et al., 1982). Schunk and Rice (1991) found that combining a process goal with progress feedback led to higher self-efficacy and skill than a process goal alone or a product goal.

The present studies tested the hypothesis that the addition of goal progress feedback would enhance the benefits of the process goal. We thought that the feedback would provide children with additional information that strategy use was improving their writing and that the perception of progress would promote self-efficacy and skill acquisition.

EXPERIMENT 1

Method

Subjects. The sample included 60 fifth-grade students from three classes in two schools. The 33 girls and 27 boys ranged in age from 10.0 to 12.0 years (M = 10 years 11 months). Although different socioeconomic backgrounds were represented, children predominantly were middle class. Ethnic composition was 37 Anglo American, 20 African American, 2 Hispanic American, I Asian American. Teachers initially nominated 64 children who received language arts instruction in regular classes and experienced no problems comprehending oral instructions. Two students were dropped because they missed instructional sessions. We discarded the data from two other students (randomly selected within cells) to equalize cell sizes.

Pretest. The pretest, which comprised self-efficacy and writing skill, was administered by a tester from outside the school. The *self-efficacy* test was given first. It assessed perceived capabilities for performing five paragraph writing tasks: generate ideas, decide on the main idea, plan the paragraph, write the topic sentence, write the supporting sentences. The efficacy scale ranged in 10-unit intervals from *10—not sure,* to *100----really sure.*

The tester explained the distinguishing characteristics and read a sample for each of four types of paragraphs: descriptive, informative, narrative story, narrative descriptive. Children were told that *descriptive* paragraphs discuss objects, events, persons, or places (e.g., describe a bird), *informative* paragraphs convey information effectively and correctly (write about something you like to do after school), *narrative story* paragraphs contain events sequenced from beginning to end (tell a story about visiting a friend or relative), and *narrative descriptive* paragraphs sequence steps in the correct order to perform a task (describe how to play your favorite game).

Children privately judged self-efficacy for performing the five tasks for each of the four paragraph types. For each type, children judged their capabilities for generating five or six ideas, thinking of a good main idea, planning the paragraph (deciding which ideas to include and what order to put them in), writing a clear topic sentence that could be understood by readers, and writing clear supporting sentences. Children's scores were averaged over the 20 judgments. The reliability of the efficacy measure was assessed with 15 children comparable in age and writing skills to subjects but who did not participate in the study. These 15 children completed the efficacy measure twice (2 weeks apart). The test–retest coefficient was r = .92. For subjects participating in this experiment, Cronbach's α was .90.

The *skill* test was administered after the efficacy test. Children were given one topic for each of the four paragraph types. Two different forms of the test were developed, which included the same four paragraph types but different topics. The parallel forms were used on the pretest and posttest to eliminate effects due to topic familiarity. Reliability of the forms was determined using 15 comparable children who did not participate in the study. Children's holistic scores on these forms correlated *r* = .85. For the present sample, Cronbach's α for the skill pretest was .83.

Paragraph quality was assessed with four holistic scales that included categories drawn from different sources (Hillerich, 1985; Odell, 1981; Shell et al., 1989). For each category, ratings were made on a 4-point scale ranging from 1 (low) to 4 as follows: *organization (1* = lacks sense or organization, unclear, confusing; 4 = well organized, smooth transitions, main idea expanded); *sentence structure and word choice (I* = lacks any sentence structure; 4 = complete sentences, variety of sentence beginnings and structures, precision in word choice); *creativity (1* = dull, uninteresting: 4 = lively, unique, exciting, concrete, vivid); *style to fit purpose (1* = no obvious attention to purpose; 4 = uses a style consistent with prescribed purpose). Children's total scores could range from 4 to 16. Paragraphs were scored independently by two raters, whose scores were averaged for the data analyses. For all subjects, the two raters' scores correlated r = .87.

Paragraphs also were scored for *words per T unit.* A *T unit* is a main clause plus attached subordinate clauses (Odell, 1981). Words per T unit is a measure of syntactic fluency and a reliable indicator of sophistication in writing skill (Hillerich, 1985). Words per T unit were averaged across paragraphs for each child. Of the 240

paragraphs (four paragraphs for each of 60 students), raters disagreed on the number of words in five paragraphs and on the number of T units in 12 paragraphs. For these paragraphs, ratings were averaged.

Instructional program. Children were assigned randomly within gender and classroom to one of four $n = 15$ experimental conditions: product goal, process goal, process goal plus progress feedback, general goal (instructional control). The average ages of students in the four conditions did not differ significantly. Subjects received 45-min instructional sessions over 20 days; 5 days were devoted to each type of paragraph. Children assigned to the same condition met in small groups with a teacher from outside the school. Teachers were two male and two female graduate students with prior classroom teaching experience. Teachers were not assigned to conditions but delivered instruction to all conditions. Our periodic observations of the sessions confirmed that instruction and experimental treatments were implemented properly. We observed no instances of teachers carrying over treatments from one condition to another (i.e., giving process goal instructions to product goal students). Groups met privately in classrooms to minimize disruptions and ensure that all students in the room at a given time received the same treatment. Students did not talk among themselves during sessions. Children's regular teachers reported no instances of children talking about the study in their classrooms.

The procedure during the five sessions devoted to each type of paragraph was identical. At the start of the first session, a tester administered a *self-efficacy for improvement* test, which was identical to that of the pretest except children judged capabilities for improving their skills at the five tasks for the paragraph type to be covered during the next five sessions rather than how well they already could perform the tasks. Scores were averaged across the five tasks. This test was given to test the hypothesis that the process goal and progress feedback treatments would raise children's beliefs about their capabilities for improving more than the product and general goal conditions, because the process goal and progress feedback treatments were designed to convey progress in learning and highlight strategy use as a means to continue to improve writing.

Following this assessment, the teacher gave the goal instructions appropriate for children's experimental assignment (discussed below), after which he or she referred to the writing strategy displayed on a poster board: What do I have to do? (1) Choose a topic to write about. (2) Write down ideas about the topic. (3) Pick the main idea. (4) Plan the paragraph. (5) Write down the main idea and the other sentences.

The first 10 min were devoted to *modeled demonstration* in which the teacher verbalized the strategy's steps and applied them to sample topics and paragraphs. Students then received *guided practice* (15 min); they applied the steps under the guidance of the teacher. The last 20 minutes of each session were devoted to *independent practice;* students worked alone while the teacher monitored their work. The daily content coverage was the same for each of the four types of paragraphs: session 1—strategy steps 1, 2, 3; session 2—strategy step 4; session 3—strategy step 5; session 4—review of entire strategy; session 5—review of entire strategy without the modeled demonstration. Children worked on two or three paragraph topics per session.

Experimental conditions. To children assigned to the *process goal* and the *process goal plus progress feedback* conditions the teacher said at the beginning of the first five sessions, "While you're working it helps to keep in mind what you're trying to do. You'll be trying to learn how to use these steps to write a descriptive paragraph." These goal instructions were identical for the other sessions except the teacher substituted the name of the appropriate type of paragraph.

Children assigned to the *product goal* condition were told at the start of the first five sessions, "While you're working it helps to keep in mind what you're trying to do. You'll be trying to write a descriptive paragraph." For the remaining sessions the teacher substituted the name of the appropriate paragraph type. These instructions controlled for the effects of goal properties included in the process goal treatment.

General goal (instructional control) students were told, "While you're working, try to do your best." This condition controlled for the effects of receiving writing instruction, practice, and goal instructions, included in the other conditions.

Each child assigned to the process goal plus progress feedback condition received feedback 3-4 times during each session. This feedback conveyed that children were making progress toward their goal of learning to use the strategy to write paragraphs. Teachers delivered feedback to each child privately during independent practice with such statements as, "You're learning to use the steps," and, "You're doing well because you followed the steps in order." To ensure that feedback was credible, teachers provided feedback contingent on the child using the strategy properly. Teachers' records showed that on 15 occasions they did not provide a child with progress feedback because the child was not using the steps properly. Progress feedback should not be confused with performance feedback, which all children received (e.g., "That's a good idea to include in your paragraph," "You need to write a sentence with this idea"). Informal observations by the authors indicated that progress feedback was given properly and that all conditions received performance feedback equally.

Posttest. The posttest included (in order) measures of progress in strategy learning, self-efficacy, and writing skill. We assessed perceived progress to test the hypothesis that process goals and progress feedback would highlight progress better than product and general goals. For this one-item measure, children judged how well they could use the strategy compared with when the project began. The 10-unit scale ranged from *10–not better*, to 90/100—a *whole lot better.*

The self-efficacy and skill tests were identical to the pretest except the parallel form of the skill test was used. Children were not explicitly told to use the strategy during the skill test; however, informal observations by the tester revealed that most children employed some of the strategy's steps. Cronbach's a was .84 for the efficacy posttest and .83 for the skill posttest. Because part of the variability in posttest measures is due to the influence of experimental treatments, we computed coefficients within each condition and report the median correlation across conditions.

TABLE 1
MEANS (AND STANDARD DEVIATIONS) OF TEST AND INSTRUCTIONAL MEASURES: EXPERIMENT 1

		Experimental condition			
Measure	Phase	Product goal	Process goal	Process goal + feedback	Control
Self-efficacy	Pretest	62.5	62.0	63.7	61.5
		(13.8)	(14.9)	(14.4)	(14.6)
	Posttest	73.4	81.2	85.6	68.9
		(6.6)	(6.2)	(8.5)	(11.8)
Skill	Pretest	8.3	8.3	8.2	8.2
		(0.9)	(1.3)	(1.3)	(1.4)
	Posttest	10.2	11.7	12.5	9.1
		(0.6)	(1.2)	(1.4)	(0.7)
Words per T unit	Pretest	8.2	8.2	7.7	7.4
		(1.3)	(1.7)	(1.5)	(1.7)
	Posttest	7.9	8.2	8.7	7.4
		(1.6)	(1.1)	(1.3)	(1.2)
Self-efficacy for improvement	Week 1	73.5	76.9	82.5	73.1
		(12.2)	(8.9)	(12.6)	(14.9)
	Week 2	73.9	79.5	85.5	65.1
		(9.9)	(10.8)	(9.5)	(15.1)
	Week 3	71.9	81.7	86.3	67.2
		(12.2)	(8.7)	(9.1)	(13.7)
	Week 4	66.5	87.1	87.9	64.3
		(14.4)	(6.0)	(9.0)	(13.4)
Progress	Posttest	67.3	75.3	87.3	68.0
		(16.2)	(11.9)	(12.2)	(10.8)

Results

Means and standard deviations of all measures are presented by condition in Table 1. Preliminary analyses of variance (ANOVAs) yielded no significant between-conditions differences on pretest measures. There were no significant differences on any measure in Table 1 due to gender or classroom and no significant interactions between condition, classroom, and gender. Conditions did not differ in the number of paragraphs written during instruction. Except as noted, statistical tests were evaluated at the conventional $p < .05$ significance level.

Self-efficacy and writing achievement. We predicted that providing students with a learning process goal would raise writing self-efficacy and achievement better than the product and general goal treatments and that the process goal plus progress feedback combination would be the most effective. To test these hypotheses we analyzed posttest self-efficacy, writing skill, and number of words per T unit with a multivariate analysis of covariance (MANCOVA); the four conditions constituted the treatment factor and the corresponding pretest measures served as covariates. The use of covariance necessitated demonstration of homogeneity of slopes across conditions. Tests of slope differences for these and other measures to which covariance was applied in Experiments 1 and 2 found the assumption of slope homogeneity to be tenable (ps > .05).

The treatment effect was significant, Wilks's $\lambda = .343$, $F(9,124.27) = 7.62$. Posttest measures analyzed separately with analysis of covariance (ANCOVA) yielded significance for self-efficacy, $F(3,55) = 11.31$, $MS_e = 73.85$, and for skill, $F(3,55) = 33.13$, $MS_e = 1.02$. Posttest means were evaluated using Dunn's multiple comparison procedure. The process goal plus progress feedback condition judged self-efficacy higher than the product and general goal conditions. Process goal children judged self-efficacy higher than general goal students. All conditions demonstrated higher skill than general goal students. The process goal and process goal plus feedback conditions demonstrated higher skill than the product goal condition.

Self-efficacy for improvement. These measures were collected because we hypothesized that the process goal would highlight strategy use as a means to improve writing and that the progress feedback would link strategy use with gains in writing skill and imply that children could continue to improve their writing by using the strategy. Mean scores at week I were higher than pretest self-efficacy, probably because the former assessed children's capabilities for improving their skills whereas the latter measured their perceptions of their present skills. Over the 4 weeks, process goal and process goal plus feedback children's scores increased; those of product and general goal subjects showed a decline.

Each of the four scores was analyzed with ANOVA using as the covariate pretest self-efficacy for the corresponding type of paragraph. Three of the analyses were significant: informative, $F(3,55) = 8.45$, $MS_e = 134.88$; narrative story, $F(3,55) = 8.73$, $MS_e = 125.01$; narrative descriptive, $F(3,55) = 19.13$, $MS_e = 128.16$. Process goal and process goal plus feedback students judged self-efficacy higher than general goal students. Process goal plus feedback children judged self-efficacy higher than product goal students for narrative story and narrative descriptive paragraphs. Process goal children made higher efficacy judgments than product goal students for the narrative descriptive paragraph.

Progress. We tested the hypothesis that the process goal treatment would raise children's perceptions of progress in strategy learning better than the product and general goal conditions and that providing progress feedback would further enhance perceived progress. This measure yielded a significant ANOVA, $F(3,56) = 7.72$, $MS_e = 167.86$. Process goal plus feedback students judged progress higher than product and general goal children.

Correlational analyses. To gain information on the relation between theoretically relevant variables, we computed correlations among the progress measure, self-efficacy for improvement (averaged across the four scores), and the posttest measures. Given the large number of correlations we adopted the $p < .01$ level of significance. As can be seen in Table 2, 8 of the 10 correlations were significant. As expected, posttest self-efficacy and skill correlated highly ($r = .83$).

TABLE 2
INTERCORRELATION OF INSTRUCTIONAL AND POSTTEST MEASURES: EXPERIMENT 1

	2	3	4	5
1. Self-efficacy for improvement	.42	.75	.65	ns
2. Posttest progress	—	.37	.47	ns
3. Posttest self-efficacy		—	.83	.35
4. Posttest skill			—	.37
5. Posttest words per T unit				—

We also determined what portion of the variation in posttest skill was accounted for by pretest efficacy and skill, experimental condition (as a categorical variable), efficacy for improvement (mean of the four scores), progress, and posttest efficacy. Predictors were entered as a block using the forward entry method (SPSS Inc., 1986). Significant predictors were posttest efficacy (69% of the variation, $p < .001$), experimental condition (13%, $p < .001$), and efficacy for improvement (1%, $p < .05$). These three predictors accounted for 83% of the variation in skill (R^2 adjusted = .82). The greater contribution of posttest efficacy is partly artifactual because it presumably is influenced by experimental condition and efficacy for improvement. We urge readers to view these findings with caution, because when multiple regression is used with a small sample the regression coefficients tend to be unstable from one sample to another (Cohen & Cohen, 1983). The present use of multiple regression seems justified to explore the influences on achievement, but replication with a larger sample is needed.

EXPERIMENT 2

Experiment 1 demonstrated benefits of providing children with strategy instruction, a process goal, and feedback on goal progress. In Experiment 2 we attempted to replicate these results and expand their generality by assessing maintenance and generalization of strategy use, self-efficacy, and skill. Evidence for transfer in strategy instruction studies is mixed (Borkowski, 1985; Borkowski et al., 1987; Pressley et al., 1990). Research has not examined whether process goals and progress feedback encourage transfer.

We predicted that the progress goal would lead to better transfer than the product goal, and that progress feedback would further enhance transfer. For reasons given earlier, we expected that the process goal and the progress feedback would raise children's perceptions of strategy usefulness and self-efficacy. We thought that children who felt confident about using a strategy they believed helped them perform better would apply the strategy diligently during writing, which enhances skill acquisition, retention, and transfer (Baker & Brown, 1984; Borkowski, 1985).

Method

Subjects. Subjects *(N* = 40, 20 boys, 20 girls) were fourth graders drawn from two classes in one school. We used fourth graders to determine whether the findings of Experiment I were replicable with a different grade. Ages ranged from 9.2 to 11.8 years *(M = 10* years 2 months). Ethnic composition was 19 Anglo American, 19 African American, 1 Hispanic American, 1 Asian American. Teachers initially nominated 45 children according to the criteria used in Experiment I. Three students were dropped because they missed instructional sessions. We randomly excluded the data of two other students from the appropriate cells to equalize sizes.

Pretest. Except as indicated, we used the same pretest, instructional session, and posttest materials and procedure as in Experiment I. In addition to self-efficacy and writing achievement, the pretest included a measure of self-reported use of the steps in the writing strategy. This measure gave us a baseline rate of strategy use and because we included it on the post-and maintenance tests allowed determination of effects due to experimental treatments. The instrument had five scales ranging in 10-unit intervals from *0—not at all,* to 100—a *whole lot.* Scales were labeled *write ideas, pick main idea, plan paragraph, write topic sentence, write other sentences.* Children thought about times they wrote paragraphs and marked how often they performed each step. Scores were averaged across the five judgments.

The self-efficacy and skill tests included the four paragraph types of Experiment 1 as well as two additional ones (classificatory and expressive) that were not covered during instruction and were measures of generalization. *Classificatory* paragraphs involve comparing, contrasting, and noting similarities and differences (e.g., describe how birds and people are alike and different). *Expressive* paragraphs express ideas and feelings about hypothetical situations (tell how you would feel if it rained every day of the year). For the self-efficacy test, children judged the five tasks for each of the six paragraphs types (30 judgments). The six paragraphs for each child were scored for skill and words per T unit by two raters using the criteria employed in Experiment 1.

The reliability of the expanded self-efficacy instrument was assessed using 12 children who did not participate in this study but completed the efficacy test twice (two weeks apart); test–retest r = .91. Cronbach's α for participating children was .88. Comparable topics were developed for the pretest, posttest, and maintenance skill tests. Twelve other children not participating in the study completed these three tests; range of rs for holistic scores = .78 to .88. For Experiment 2 subjects, Cronbach's α for the skill pretest was .82.

Instructional program and experimental conditions. Children were assigned randomly within gender and classroom to one of four n = 10 conditions: product goal, process goal, process goal plus progress feedback, general goal (instructional control). Students received 45-min instructional sessions over 20 days; 5 days each were devoted to descriptive, informative, narrative story, and narrative descriptive paragraphs. Instructional procedures, goal instructions, progress feedback, and self-efficacy for improvement assessments were the same as those in Experiment 1. Two male and two female graduate students with classroom teaching experience taught students in all conditions.

Posttest. The posttest included (in order) measures of perceived progress in strategy learning, strategy value, self-reported strategy use, self-efficacy, and writing achievement. The progress measure was identical to that of Experiment I. The self-efficacy and the self-reported strategy use tests were identical to those of the pretest in Experiment 2; a parallel form of the skill test was used. Cronbach's α for the posttest measures was .90 (efficacy) and .84 (skill). The strategy value measure reflected the theoretical notion that perceived strategy usefulness is an important influence on strategy use (Borkowski, 1985; Paris et al., 1982). We felt the process goal and progress feedback treatments might help raise perceived value. This one-item measure consisted of a 10-unit scale ranging from *10—not much,* to 90/100—a *whole lot.* Children judged how much they felt the strategy's steps helped them write paragraphs.

Maintenance test. This test was administered 6 weeks following the posttest, during which time children received no supplementary strategy instruction. The test included (in order) strategy use, self-efficacy and achievement. Measures were identical to those of the posttest except a parallel form of the skill test was used. Cronbach's α was .96 (efficacy) and .82 (skill).

To obtain additional information on strategy use and achievement we administered a think-aloud procedure a week after this test. The tester met privately with children individually and asked them to think about their work during the project. The tester said he was interested in children's thoughts while writing. Children were given a topic and asked to write a descriptive paragraph in the same fashion as they did during the project. The tester told children to say aloud everything they thought about but he did not remind them of the strategy. He wrote down students' verbalizations and prompted if they did not verbalize for several seconds. Verbalizations were scored by two raters who awarded I point for each step or close approximation; range of scores was 0 to 5. We did not count step one (choose a topic to write about) because we gave children the topic. We broke step five (write down the main idea and the other sentences) into two steps. Raters agreed on 37 of the 40 transcripts; the remaining three were averaged. Paragraphs also were scored for skill holistically and for words per T unit.

Results

Preliminary ANOVAs yielded no significant between-conditions differences on pretest measures. There were no significant differences on any measure shown in Table 3 due to classroom or gender, nor were there significant interactions between condition, classroom, and gender. Within each condition there were no significant differences at each phase (pretest, posttest, maintenance test) between self-efficacy or skill scores on the four paragraphs covered during instruction and the two generalization paragraphs; therefore, data were pooled across categories. There were no significant within-conditions differences at each phase between the five strategy use scales; data were pooled across scales. Conditions did not differ in number of paragraphs worked on during instruction. Except as noted, the hypotheses tested are the same as those in Experiment 1.

Self-efficacy and writing achievement. Posttest and maintenance test self-efficacy, writing skill, and words per T unit were analyzed with MANCOVA; conditions constituted the treatment factor and corresponding

pretest measures served as covariates. For the posttest measures the treatment effect was significant, Wilks's λ = .260, F(9,75.60) = 6.21. ANCOVA yielded significant effects for self-efficacy, F(3,35) = 2.92, MS_e = 282.41; skill, F(3,35) = 11.72, MS_e = 2.12; words per T-unit, F(3,35) = 14.98, MS_e = 0.57.

Process goal plus feedback students judged self-efficacy higher than general goal students. Process goal plus feedback children outperformed general and product goal students on writing skill; process goal children scored higher than general goal students. Process goal plus feedback and process goal students wrote more words per T unit than did product and general goal children.

TABLE 3
MEANS (AND STANDARD DEVIATIONS) OF TEST AND INSTRUCTIONAL MEASURES: EXPERIMENT 2

Measure	Phase	Experimental condition: Product goal	Process goal	Process goal + feedback	Control
Self-efficacy	Pretest	59.3	59.3	63.0	58.7
		(9.7)	(17.0)	(11.3)	(13.4)
	Posttest	74.6	77.5	89.1	67.7
		(13.2)	(11.9)	(5.6)	(12.0)
	Maintenance	75.4	77.3	86.7	62.9
		(18.6)	(18.7)	(7.1)	(18.3)
Skill	Pretest	7.4	7.6	7.7	7.6
		(1.3)	(1.7)	(1.4)	(1.6)
	Posttest	9.9	10.8	12.0	8.2
		(2.2)	(1.0)	(1.5)	(0.9)
	Maintenance	10.4	10.8	12.1	7.3
		(2.7)	(0.8)	(1.3)	(2.6)
Words per T unit	Pretest	7.1	6.1	7.4	7.2
		(0.8)	(0.6)	(0.6)	(1.6)
	Posttest	6.5	7.7	7.8	6.1
		(0.8)	(1.0)	(0.4)	(0.9)
	Maintenance	6.2	7.2	7.4	6.1
		(1.3)	(0.5)	(0.4)	(1.1)
Strategy use	Pretest	66.4	65.0	60.8	62.2
		(22.6)	(21.9)	(15.7)	(22.2)
	Posttest	70.4	76.8	89.6	63.0
		(22.1)	(15.0)	(7.2)	(25.2)
	Maintenance	68.4	82.4	85.8	66.3
		(25.2)	(14.9)	(9.4)	(23.7)
Self-efficacy for improvement	Week 1	76.4	72.0	85.6	74.6
		(17.6)	(16.3)	(10.4)	(24.5)
	Week 2	76.4	73.8	87.4	71.0
		(19.1)	(12.5)	(6.5)	(22.6)
	Week 3	73.2	75.8	89.8	65.8
		(21.6)	(15.3)	(7.3)	(18.4)
	Week 4	71.6	72.6	90.4	66.6
		(21.9)	(13.2)	(6.2)	(16.4)
Progress	Posttest	62.0	88.0	90.0	60.0
		(31.2)	(15.7)	(11.0)	(24.0)
Strategy value	Posttest	50.0	75.0	93.0	54.0
		(34.3)	(23.7)	(6.7)	(21.2)
Verbalizations	Think aloud	3.1	4.0	4.4	2.8
		(1.4)	(0.9)	(0.8)	(1.2)
Skill	Think aloud	10.4	10.9	12.6	9.2
		(3.1)	(2.9)	(1.9)	(2.6)
Words per T-unit	Think aloud	6.5	6.6	6.6	6.3
		(1.3)	(0.8)	(1.1)	(1.3)

Maintenance test measures yielded a significant treatment effect, Wilks's λ = .344, F(9,75.60) = 4.63. ANCOVA revealed significance for self-efficacy, F(3,35) = 3.01, MS_e = 354.22; skill, F(3,35) = 10.49, MS_e = 3.83; words per T-unit, F(3,35) = 6.72, MS_e = 0.78. Process goal plus feedback children judged self-efficacy higher than general goal children. On writing skill, all conditions outperformed general goal students. Process goal plus feedback children wrote more words per T unit than did product and general goal students; process goal children wrote more than general goal students.

Strategy use. We tested the hypotheses that providing a process goal would raise strategy use more than giving students a product or general goal and that the process goal plus progress feedback condition would demonstrate the greatest strategy use. Posttest and maintenance test scores were analyzed with ANCOVA using the pretest score as the covariate. These analyses were significant: posttest $F(3,35) = 6.51$, $MS_e = 218.02$; maintenance test $F(3,35) = 4.39$, $MS_e = 239.96$. Process goal plus feedback children reported greater strategy use than general goal students on the posttest and maintenance tests and greater use than product goal students on the posttest.

Self-efficacy for skill improvement. ANCOVA using pretest self-efficacy for the corresponding type of paragraph as the covariate revealed significance for the narrative story, $F(3,35)$, $MS_e = 269.50$, and narrative descriptive paragraphs, $F(3,35) = 4.03$, $MS_e = 221.62$. Process goal plus feedback children judged efficacy higher than general goal students on the story and narrative descriptive paragraphs and higher than product goal children on the latter paragraph.

Progress. ANOVA was significant, $F(3,36) = 5.10$, $MS_e = 479.44$. Process goal plus feedback children judged progress greater than product and general goal students; process goal children judged progress higher than general goal children.

Strategy value. We tested the hypotheses that process goals would promote perceptions of strategy value more than product and general goals and that providing progress feedback with process goals would further raise perceived value. ANOVA yielded a significant result, $F(3,36) = 7.13$, $MS_e = 558.33$. Process goal plus feedback students judged value higher than product and general goal children.

Think aloud. Verbalizations yielded a significant ANOVA, $F(3,36) = 4.51$, $MS_e = 1.25$. The process goal plus feedback condition verbalized more steps than the general goal condition. The ANOVA for skill was significant, $F(3,36) = 2.90$, $MS_e = 7.26$. Process goal plus feedback students outperformed general goal children.

Correlations. Correlations among instructional, posttest, and maintenance test measures are shown in Table 4. As in Experiment 1, an average self-efficacy for improvement score was used in these analyses. Given the large number of correlations, only those significant at the $p < .01$ level are reported. To simplify this discussion, we summarize correlations for variables not addressed in Experiment 1: posttest strategy use and value, all maintenance test measures.

Posttest strategy use was positively correlated with posttest self-efficacy and skill, strategy value, progress, self-efficacy for improvement, and maintenance test strategy use and self-efficacy. Strategy value was positively related to all posttest measures and to maintenance test strategy use and self-efficacy. Maintenance test strategy use related positively to self-efficacy for improvement, all posttest measures except words per T unit, and maintenance test self-efficacy and skill. Maintenance test self-efficacy correlated positively with self-efficacy for improvement, posttest strategy use and value, self-efficacy and skill, and maintenance test strategy use and skill. Skill was related to posttest skill and maintenance test skill and words per T unit.

GENERAL DISCUSSION

The present studies represent a systematic investigation of the role of process goals and progress feedback during writing skill acquisition. Goal setting theory and research have not addressed differences between process and product goals. Self-efficacy theory discusses goal setting but there is little research on the effects of process goals and progress feedback. These two studies address these needs.

We had predicted that (a) providing children with a process goal of learning a writing strategy would enhance achievement outcomes better than would a product goal of writing paragraphs or a general goal of working productively and (b) giving process goal students feedback on their progress toward their goal of learning to use the strategy effectively would further enhance outcomes. In both studies we found that children who received process goals plus progress feedback outperformed general goal students on posttest self-efficacy and skill,

efficacy for improvement (third and final weeks), and progress in strategy learning; they scored higher than product goal children on posttest skill, efficacy for improvement (final week), and progress. In Experiment 1, process goal plus feedback children scored higher than general goal subjects on efficacy for improvement (second week) and higher than product goal children on posttest efficacy and on efficacy for improvement (third week); in Experiment 2, they wrote more words per T unit and judged posttest strategy use and value higher than product and general goal students.

TABLE 4
INTERCORRELATIONS OF INSTRUCTIONAL, POSTTEST, AND MAINTENANCE TEST MEASURES: EXPERIMENT 2

Variable	2	3	4	5	6	7	8	9	10	11
1. Self-efficacy for improvement	ns	ns	.56	.73	.55	ns	.54	.51	ns	ns
2. Posttest progress	—	.73	.54	.51	ns	.43	.65	ns	ns	ns
3. Posttest strategy value		—	.61	.52	.45	.45	.60	.44	ns	ns
4. Posttest strategy use			—	.84	.53	ns	.77	.49	ns	ns
5. Posttest self-efficacy				—	.55	ns	.81	.68	ns	ns
6. Posttest skill					—	.44	.43	.50	.72	ns
7. Posttest words per T-unit						—	ns	ns	ns	ns
8. Maintenance test strategy use							—	.57	.45	ns
9. Maintenance test self-efficacy								—	.52	ns
10. Maintenance test skill									—	.45
11. Maintenance test words per T unit										—

These results cannot be due to differences in goal properties; although the process and general goals differed in specificity, the process and product goals seem comparable in specificity, proximity, and difficulty. These results also are not due to strategy instruction, because all students were taught the strategy. An explanation based on theory and research is that a process goal highlights strategy use as a means to improve writing. Students who believe they are learning a useful strategy may feel efficacious about improving their writing and motivated to apply the strategy (Borkowski, 1985; Schunk, 1989). Progress feedback conveys that the strategy is useful and that students are becoming skillful (Borkowski et al., 1988; Paris et al., 1982); as a persuasive source of efficacy information, progress feedback can raise efficacy by conveying that learners are capable of continuing to improve their skills (Schunk & Rice, 1991). These beliefs are validated as students work on the task. In contrast, a general goal or a goal of writing paragraphs may not convey the same strategy importance. Learners who do not believe a strategy contributes much do not employ it systematically or feel confident about learning (Borkowski et al., 1987; Paris et al., 1982).

As predicted, we also found that combining process goals with progress feedback enhanced transfer of writing strategy use, skill, and self-efficacy. This finding is important, because research has not examined how process goals and progress feedback affect transfer and many strategy instruction studies find no evidence of transfer (Borkowski, 1985; Pressley et al., 1990). We hypothesized that the process goal and progress feedback would enhance transfer by raising perceived strategy usefulness and self-efficacy. Experiment 2 provides indirect support for this idea. Process goal plus feedback students displayed higher maintenance efficacy compared with general goal children and judged strategy value higher than product and general goal students; value correlated positively with maintenance test strategy use and efficacy. Research is needed on the mechanism underlying transfer effects.

We found that children who received the process goal without progress feedback outperformed product and general goal children on several measures. These results conflict with those of Schunk and Rice (1989, 1991), who found that a process goal without progress feedback offered no advantage over a product goal. Our experiments differ from these other studies in subjects, content, and instructional format, so the cause of the discrepancy cannot be determined. One possibility is that without progress feedback our average achievers could assess strategy usefulness and how well they were learning better than Schunk and Rice's remedial

subjects. In support of this point, our process goal without progress feedback children did not differ from process goal with feedback subjects on perceived strategy value and progress. Other evidence shows that children with cognitive deficiencies have difficulty determining strategy usefulness and often do not derive reliable competency information on their own (Borkowski et al., 1988; Licht & Kistner, 1986).

The process goal plus progress feedback condition demonstrated higher performance than the process goal without feedback condition in both experiments, although the differences were not statistically significant. These findings are noteworthy given that many children have difficulty assessing their writing skills (Hillerich, 1985). Perhaps our paragraph writing task was not too complex and process goal children could ascertain on their own that their writing was improving and that the strategy was aiding them. Research could replicate our studies with a more extensive task (e.g., essays, reports) where the addition of progress feedback might yield significant effects.

We recommend investigating writing over extended periods. Our intervention and think-aloud session were short. Repeated think-aloud sessions, along with periodic assessments of achievement outcomes, can determine changes in strategy use, self-efficacy, and skills. This focus reflects the current emphasis on using think-aloud protocols to explore writing processes (Scardamalia & Bereiter, 1986). This research also could test the theoretical notion that goals and feedback affect performance in part through their intervening effects on self-efficacy (Bandura, 1986).

The present research supports the idea that self-efficacy is influenced by one's performances but is not merely a reflection of them (Bandura, 1986). Experimental conditions showed gains in self-efficacy as a consequence of writing strategy instruction and practice and they did not differ in the number of paragraphs completed during instruction; however, experimental treatments produced between-conditions differences in self-efficacy on subsequent tests. These studies also show that self-efficacy was highly predictive of skill and strategy use, which supports findings of writing research in other settings (Meier et al., 1984; Shell et al., 1989).

This research has implications for classroom writing instruction. Many strategy training programs improve students' skills, but students discontinue using the strategy when no longer required to apply it. Strategy training easily can be incorporated into regular instruction, along with the goal of learning the strategy and feedback on goal progress. Our results suggest that process goals and progress feedback, combined with a sound instructional program, foster writing skills, self-efficacy, and strategy use.

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