Participation in Goal Setting: Effects on Self-Efficacy and Skills of Learning-Disabled Children

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Abstract:

This experiment tested the hypothesis that participation in goal setting enhances self-efficacy and skills. Subjects were sixth-grade children who previously had been classified as learning disabled in mathematics. Children received subtraction training that included instruction and practice opportunities over several sessions. Some children set proximal performance goals each session, others had comparable proximal goals assigned, and children in a third condition received the training but no goals. Although proximal goals promoted motivation more than no goals, participation in goal setting led to the highest self-efficacy and subtraction skill. Implications for teaching are discussed.

Article:

According to Bandura (1977a, 1981, 1982), different psychological procedures change behavior in part by creating and strengthening a sense of *self-efficacy.* Self-efficacy means personal judgment of one's performance capabilities in specific situations that may contain ambiguous, unpredictable, and stressful features. Self-efficacy is hypothesized to influence choice of activities, effort expenditure, perseverance, and task accomplishments.

Although self-efficacy originally was employed to help explain coping behaviors in fearful situations, its role has been extended to other contexts, including children's cognitive skill acquisition (Schunk, 1981, 1983a, 1983b). The latter research has shown that educational practices are important contextual influences on self-efficacy and differ in the type of efficacy information they convey (Schunk, 1984). In turn, self-efficacy affects the level of skillful performance.

This study represents an extension of the self-efficacy model to children with learning disabilities. By definition, learning-disabled children do not possess intellectual deficits but perform below their measured abilities. Repeated difficulties in school result in academic deficiencies, interfere with general self-functioning, and engender a sense of inefficacy for coping with cognitive demands (Palmer, Drummond, Tollison, & Zinkgraff, 1982). Compared with nondisabled students, those with learning disabilities hold a lower sense of cognitive competence (Evans, 1983; Lincoln & Chazan, 1979). Self-doubts about capabilities are associated with adverse emotional reactions, lackadaisical efforts, and lower skill development (Bandura, 1982; Schunk, 1984).

One common educational practice is goal setting. Comparing present performance level with a desired standard can enhance motivation (Bandura, 1977b). Of central importance are goal properties: specificity, difficulty level, and proximity (Bandura, 1977b; Latham & Yukl, 1975; Locke, 1968; Locke, Shaw, Saari, & Latham, 1981). Goals that incorporate specific performance standards lead to higher performance than no explicit or general goals, such as, "do your best" (Locke, 1968; Locke et al., 1981). Assuming that students have sufficient ability, a positive relationship exists between difficulty level and performance (Locke et al., 1981). Proximal goals, which are close at hand, result in greater motivation than goals extending farther into the future (Bandura,

1977b). Research with children investigating different goal properties shows that goals enhance performance (Bandura & Schunk, 1981; Gaa, 1973; Rosswork, 1977; Schunk, 1983a, 1983b; Tollefson et al., 1982).

One purpose of this study was to explore the effects of proximal goals on the self-efficacy and skillful performance of learning-disabled children during a subtraction training program. In this study, some children pursued goals of completing a certain number of' pages of problems each session, whereas others worked without goal instructions. Proximal goals can instill in children an initial sense of self-efficacy for performing well, which is substantiated later as children observe their progress toward the goal (Schunk, 1984). Feelings of efficacy sustain motivation and foster skill development (Schunk, 1983a). Goal attainment, or even a close approximation, further validates self-efficacy (Schunk, 1983b). In the absence of goals, children should be less sure about their capabilities because they lack a standard against which to gauge progress. Self-doubts do not promote self-efficacy or skills (Schunk, 1984).

Within this context, this study tested the idea that participation in goal setting enhances achievement behaviors. Half the proximal-goal children set their own session goals, whereas comparable goals were assigned to the other half. There are at least two ways that participation can affect performance (Locke et al., 1981). Participation often leads to self-set goals that are more difficult to attain than assigned goals, and goal difficulty increases performance (Locke et al., 1981). In the present study, objective goal difficulty was equated across the two proximal-goal conditions, thereby eliminating this possibility.

Participation also can result in a high degree of goal commitment, which increases performance (Locke et al., 1981). People are more apt to accept goals when they believe they can attain them (Mento, Cartledge, & Locke, 1980). Furthermore, participation may be especially beneficial for persons low in need for achievement, who initially may hold low expectations for success (Steers, 1975).

Children who set their own goals were expected to demonstrate the highest self-efficacy and skills. It was felt that participation would lead to high expectations for goal attainment. This sense of efficacy for performing well was expected to be substantiated later as children solved problems. In contrast, assigned-goals children might not experience a correspondingly high initial sense of efficacy. Given their prior difficulties in arithmetic, it seemed possible that they could perceive the goals as too difficult. To the extent that they felt somewhat less certain of their subtraction capabilities, such uncertainty would not foster self-efficacy or skills quite as well.

A mathematical competency (subtraction) was chosen for several reasons. First, the present study focused on processes whereby skills and self-efficacy could be developed when they initially were low. The subjects were sixth graders who previously had been identified by the school district as learning-disabled in mathematics and who, despite much instruction in previous grades, still had not mastered subtraction operations. Thus, subjects were expected to enter the experiment with low skills and self-efficacy for solving subtraction problems. Second, the effectiveness of goal setting depends on subjects understanding the nature of the goal instructions (i.e., what they should try to accomplish) and being able to gauge progress toward the goal. Previous similar research with low-achieving but nondisabled students (Bandura & Schunk, 1981) shows that these conditions are satisfied using mathematical tasks and defining goals in terms of number of pages of problems to complete. From a practical perspective, students' subtraction deficiencies were thwarting development of more complex mathematical skills (e.g., division). It also was felt that the present results would have important implications for mathematics instruction because proximal goals fit well with resource teachers' normal lesson planning and teachers easily can implement goal setting procedures.

METHOD

Subjects

The sample included 30 sixth-grade children from two middle schools (grades 6 to 8). Ages ranged from 12 years 2 months to 14 years 7 months *(M* = 13.5 years). The 15 boys and 15 girls were predominantly middle class. All children had been previously identified by the school district as learning disabled in mathematics according to state guidelines and were receiving special education services daily. Their intelligence scores

(WISC-R) ranged from 85-110 (Wechsler, 1974), and their mathematical achievement scores, as assessed by the Woodcock-Johnson Psycho-Educational Battery (Woodcock & Johnson, 1977), ranged from 1-1.5 *SD*s lower than their WISC-R scores.

Because this study focused on processes whereby skills and self-efficacy could be developed when they were initially low, children's resource teachers were shown the subtraction skill test and identified students who they felt could not correctly solve more than 25% of the problems. These children were administered the pretest individually by one of two female adult testers drawn from outside the school.

Pretest

Self-efficacy. Children's self-efficacy for solving subtraction problems correctly was measured following procedures of previous research (Bandura & Schunk, 1981; Schunk, 1983a, 1983b). The efficacy scale ranged from 10 to 100 in 10-unit intervals from high uncertainty (10), through intermediate values (50-60), to complete certitude (100). Children initially received practice 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 were shown 25 sample pairs of subtraction problems for about 2 seconds each. This brief exposure allowed assessment of problem difficulty but not actual solutions. The two problems constituting each pair were similar in form and difficulty to one problem on the ensuing skill test, although they involved different numbers. Thus, children were judging their capability to solve different types of problems and not whether they could solve any particular problem. Children made each judgment privately by circling an efficacy value. They were advised to be honest and mark how they really felt. Scores were summed across the 25 judgments and averaged.

Subtraction skill. The skill test was given next. It included 25 subtraction problems ranging from 2 to 6 columns. Each problem tapped one of the following operations: no borrowing, borrowing once, borrowing from a one, borrowing twice, borrowing caused by a zero, and borrowing across zeros. Of these 25 problems, 12 were similar to the problems that children solved during the subsequent training sessions, whereas the other 13 were more complex. For example, during training children solved problems requiring double borrowing, whereas some skill test problems required triple borrowing. The measure of skill was the number of problems solved correctly.

The tester presented the problems one at a time and instructed children to examine each problem, decide how long they wanted to spend on it, and place each page on a completed stack when they finished solving the problem or chose not to work on it any longer. Children were given no performance feedback.

Training Procedure

Following the pretest, children were assigned randomly within sex and school to one of three treatment groups (*ns* = 10) and received 45-minute training sessions over five consecutive school days, during which they worked on a packet consisting of seven sets of material. These sets were ordered from least to most difficult as follows: no borrowing, borrowing once in two-column problems, borrowing once in three-column problems, borrowing caused by a zero, borrowing twice, borrowing from a one, and borrowing across zeros (Friend & Burton, 1981). The format of each set was identical. The first page contained written explanation of the subtraction operation and two step-by-step worked examples. The next six pages each contained several similar problems to solve. Each explanatory page fully covered the operations required to solve the problems on the following six pages.

Children were seated individually in the resource room by one of two female adult proctors, and worked at sufficient distances from others to preclude contact. Each proctor was responsible for approximately equal numbers of children in each experimental condition. Initially, the proctor reviewed the first explanatory page by pointing to the operations while reading from the narrative that explained the steps. She instructed students to work the pages in order and that whenever they came to a similar page they were to bring it to her for review.

The proctor then gave the appropriate goal instructions, stressed the importance of careful work, and moved out of sight. Children solved problems alone and received no feedback on the accuracy of their solutions. At the end of each session, they marked their places and resumed there the following day.[2]

Treatment Conditions

Self-set goals. To children assigned to this condition, the proctor suggested at the start of each session that they establish a performance goal as follows:

> While working problems, it helps to have something in mind that you're trying to do. For example, you could try to work a certain number of pages today. Why don't you decide how many pages you think you could work today? Choose a number between 4 and 10 pages. Of course, if you do more that's even better, but you should try to work at least the number of pages that you choose. How many pages would you like to try to work?

The proctor departed once children established a goal. Upper and lower page limits were prescribed because learning-disabled children often set unrealistic goals (Robbins & Harway, 1977; Tollefson et al., 1982). These limits were derived from a pilot study in which comparable learning-disabled students worked with-out goals, and represented their average number of pages completed. At the end of each session, the proctor totaled the pages completed and compared the total with the goal (over, same, under).

Assigned goals. The proctor gave these children the following instructions at the start of the first session:

> While working problems, it helps to have something in mind that you're trying to do. For example, you could try to work a certain number of pages today. Why don't you try to work 7 pages today? Of course, if you do more that's even better, but you should try to work at least 7 pages.

Seven pages represented the average goal established by self-set children during the first training session. For each session, the goal suggested to assigned-goals subjects was the self-set condition's average for the corresponding session. This procedure equated objective goal difficulty across conditions. The proctor totaled pages at the end of each session and compared the total to the goal.

No goals. These children received the subtraction training but no goal instructions. Because the self-set and assigned-goals conditions included both goals and feedback, it was decided to disentangle these effects. The proctor totaled pages completed at the end of each session and informed no-goals children of their tota1.[3]

Expectancy of Goal Attainment

After receiving goal instructions at the start of each session, self-set and assigned-goals children judged their expectancy of goal attainment on a scale identical with the self-efficacy scale. Judgments from the five sessions were aver-aged. To control for potential effects of making judgments, no-goals children judged their expectancy of "doing your best." Because the latter judgments otherwise are not relevant, they will not be discussed.

Post-test

The post-test was administered the day following the last session. The self-efficacy and skill-test instruments and procedures were similar to those of the pretest except that a parallel form of the skill test was used to eliminate possible problem; familiarity. For any given child, the same tester administered the pretest and the post-test, had not served as the training proctor, and was blind to the child's treatment condition. All tests and training materials were scored by an adult who was unaware of children's experimental assignments.

RESULTS

Means and standard deviations of all measures are presented by experimental condition in Table 1. Preliminary analyses of variance (ANOVAs) revealed no significant differences due to tester, school, or sex of child on any measure, nor any significant interactions. The data were pooled across these variables. There also were no

significant differences between experimental conditions on any pretest measure. Post-test measures were analyzed with analysis of covariance (ANCOVA), using the appropriate pretest measure as the covariate. The three experimental conditions constituted the treatment factor. Significant *F* ratios were analyzed using the Newman-Keuls test (Kirk, 1968).

TABLE 1
MEANS (AND STANDARD DEVIATIONS)

		Experimental Condition		
Measure	Phase	Self-Set Goals	Assigned Goals	No Goals
Self-efficacy[a]	Pretest	51.4 (17.8)	49.1 (20.6)	47.8 (15.9)
	Post-test	86.7 (7.0)	69.3 (25.6)	60.1 (19.8)
Skill[b]	Pretest	5.0 (2.4)	6.3 (4.4)	4.9 (2.9)
	Post-test	14.8 (4.6)	9.8 (6.2)	8.9 (4.5)
Training progress[c]	—	232.4 (34.7)	206.5 (49.5)	158.0 (44.0)
Goal attainment[d]	—	86.0 (13.5)	55.0 (24.2)	—

n = 30; *ns* = 10
[a]Average score on 25 judgments; range of scale: 10 (low)-100.
[b]Number of correct solutions on 25 problems.
[c]Number of problems completed.
[d]Range of scale: 10 (low)-100.

The use of ANCOVA necessitated demonstration of slope homogeneity across experimental conditions (Kerlinger & Pedhazur, 1973). Tests of slope differences for each measure were made by comparing a linear model that allowed separate slopes for the three conditions against a model that had only one slope parameter for estimating the pretest—post-test relationship pooled across the three conditions. These analyses found the assumption of slope homogeneity across treatments to be tenable.

Self-Efficacy

ANCOVA yielded a significant between-condition difference, $F(2,26) = 4.96$, $p < .05$. Post hoc analyses revealed that self-set children judged self-efficacy higher than assigned-goals ($p < .05$) and no-goals subjects ($p < .01$). The latter two conditions did not differ.

Skill

A significant between-condition difference was obtained, $F(2, 26) = 4.10$, $p < .05$. Post hoc analyses showed that the self-set condition demonstrated higher subtraction skill than the assigned-goals ($p < .05$) and no-goals ($p < .05$) groups. Subtraction skill of the latter two conditions did not differ.

Training Progress

To determine whether goal treatments differentially influenced rate of problem solving during training, the number of problems completed was analyzed with ANOVA. A significant treatment effect was obtained, $F(2, 27) = 7.64$, $p < .01$. Newman-Keuls comparisons showed that both the self-set ($p < .01$) and assigned-goals ($p < .05$) conditions solved more problems than no-goals subjects, but the two former conditions did not differ. These higher problem-solving rates were not attained at the expense of accuracy, because similar results were found using the proportion of problems solved correctly (i.e., percentage of problems completed that were solved correctly).

Expectancy of Goal Attainment

The self-set and assigned-goals conditions differed significantly on this measure, $F(1, 18) = 12.55$,$p < .01$. Self-set children held higher initial expectations for goal attainment.

Correlational Analyses

Correlations were computed between theoretically relevant variables. Initially, correlations were computed separately for each experimental condition. Because there were no significant between-condition differences, correlations were aver-aged across conditions using an *r* to *z* transformation (Edwards, 1976).

Among proximal-goals children, expectancy of goal attainment was related to training progress (number of problems completed), $r(18) = .58$, $p < .01$, and post-test self-efficacy, $r(18) = .51$, $p < .05$. For all subjects, more rapid problem solving during training was associated with higher post-test self-efficacy, $r(28) = .67$,$p < .01$, and skill, $r(28) = .43$,$p < .05$. The same pattern of results was obtained using the proportion of problems solved correctly as the measure of training progress. Post-test self-efficacy bore a positive relationship to subsequent skill, $r(28) = .77$, $p < .01$.

DISCUSSION

This study shows that participation in goal-setting enhanced the self-efficacy and skill development of learning-disabled children. The differences between the two proximal-goal conditions cannot be due either to training performance variations (these groups made comparable progress) or to variations in objective goal difficulty, which have confounded much research on participation (Locke et al., 1981).

An explanation for these effects is as follows. Allowing children to establish goals yielded high initial expectations for goal attainment. Children's initial sense of efficacy for performing well was likely validated by observation of their goal progress, as well as by their goal attainment or a close approximation (Schunk, 1984). In turn, a strong sense of self-efficacy leads to skillful test performance. Although assigned-goals children performed as well during training, their lower initial expectancy of goal attainment may have left them somewhat more in doubt about their capabilities, which can affect test performance.

These results conflict with those of Bandura and Schunk (1981), who found that with nondisabled, skill-deficient children that proximal assigned goals enhanced self-efficacy and subtraction skill more than no goals. The discrepant findings may be due to the different types of subjects. Compared with nondisabled students, learning-disabled children often judge academic expectations lower (Bryan & Bryan, 1981). Past difficulties in arithmetic may have been largely responsible for assigned-goals subjects viewing their goal attainment chances with some uncertainty. Although goal attainment expectancies were not assessed by Bandura and Schunk, their proximal-goals children may have felt more certain than the present assigned-goals subjects. Participation in goal setting may be more beneficial for children who possess cognitive deficiencies and hold low expectancies for success than for children who approach tasks with greater self-assuredness.

Upper and lower limits were placed on goal choices because learning-disabled students often establish inappropriate standards and may not systematically use performance information in selecting goals (Robbins & Harway, 1977; Tollefson et al., 1982). Unrealistically high or low goals will not facilitate self-efficacy or skill development (Bandura, 1977b). Goals beyond one's capabilities result in failure and low self-efficacy, whereas goals set too low provide no new information about one's capabilities. Training in goal setting often may be necessary prior to any type of systematic goal application (Sagotsky, Patterson, & Lepper, 1978; Tollefson et al., 1982).

The results of this study must be qualified due to its short-term nature. When goals are assigned, subjects initially may act in accordance with situational demands and try to attain the goals rather than follow their own preferences (Locke et al., 1981). The present results suggest that assigned-goals subjects viewed the goals as difficult. Had this study been continued for a longer period, these subjects would have gained more information about what they were capable of doing and may have abandoned the goals. Some subjects might have begun to implicitly set their own goals and pursued those goals rather than those assigned to them. Because these subjects would likely have held higher expectations for attaining their personal goals, they eventually might have developed self-efficacy and skills comparable to those of self-set subjects. Other subjects might not have adopted their own goals but instead concluded that because the assigned goals appeared so difficult there was little sense to trying to attain them. This would have adversely affected self-efficacy and skill development. In short, comparisons of self-set with assigned goals may be most valid over short time periods.

This study supports the theoretical notion that although self-efficacy is influenced by prior performances, it is not merely a reflection of them (Bandura & Schunk, 1981; Schunk, 1983a, 1983b). The two proximal-goal

conditions did not differ in rate or accuracy of problem solving during training, but self-set children judged post-test efficacy higher. This study also supports the idea that self-efficacy bears an important relationship to subsequent achievement (Schunk, 1981). Personal expectations for success are viewed as important influences on achievement by a variety of theories (Bandura, 1977b; Covington & Omelich, 1979; Kukla, 1972; Moulton, 1974; Schunk, 1984; Weiner, 1979).

This research has implications for teaching. Learning-disabled children—including those at appropriate ability levels—often are unwilling to attempt tasks and may work halfheartedly (Thomas, 1979). Participation in goal setting may help promote more active task engagement. Goal setting can be implemented easily in schools (Gaa, 1973). Children may initially require training or other assistance in establishing goals (Tollefson et al., 1982), but as they work at the task they should become better informed of its demands and their capabilities to meet them. Participation in goal setting may enhance children's skills and sense of efficacy for applying these skills.

Notes:

[2] For goal setting to promote achievement outcomes, children had to succeed at solving problems. As a check on success, each proctor privately reviewed her children's work after they departed each day. Allowing for occasional computational errors, children solved the problems correctly.

[3] Although experimental conditions were counterbalanced across schools, within each school the order of administration was no goals, self-set goals, assigned goals. Had all treatments been run simultaneously, no-goals children might have wondered why they did not receive goals. Administering self-set goals prior to assigned goals was necessary to equate goal difficulty. This systematic ordering should not have biased the results, because children were assigned to conditions randomly and the study was of short duration.

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