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AUTHOR	Schunk, Dale H.
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ABSTRACT

This paper discusses the role of perceived self-efficacy during self-regulated learning, the process whereby students' cognitions manifest themselves in behaviors systematically oriented toward the attainment of academic learning goals. The conceptual focus derives from A. Bandura's social cognitive learning theory. A model of cognitive skill learning is presented. At the outset of learning tasks, students vary in their self-efficacy for learning, or beliefs about their capabilities to effectively apply their knowledge and skills to learn academic content As students work on tasks, they derive cues from task engagement variables that signal how well they are learning and that they use to assess efficacy for continued learning. Research is summarized showing the effects on self-efficacy and achievement behaviors of task engagement (social, instructional) variables. Empirical evidence supports the idea that self-efficacy is a useful predictor of motivation and learning. The paper concludes with suggestions of ways to foster maintenance and generalization of self-regulated learning and with educational implications of the research findings. Seven pages of references are provided, and a figure of the self-efficacy model is appended. (SLD)

Perceived Self-Efficacy and Related Social Cognitive Processes as Predictors of Student Academic Performance

Dale H. Schunk

School of Education

University of North Carolina - Chapel Hill

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Abstract

This paper discusses the role of perceived self-efficacy during self-regulated learning. The conceptual focus derives from Bandura's social cognitive learning theory. A model of cognitive skill learning is presented. At the outset of learning tasks, students vary in their self-efficacy for learning, or beliefs about their capabilities to effectively apply their knowledge and skills to learn academic content. As students work on tasks, they derive cues from task engagement variables that signal how well they are learning and that they use to assess efficacy for continued learning. Research is summarized showing the effects on self-efficacy and achievement behaviors of task engagement (social, instructional) variables. Empirical evidence supports the idea that self-efficacy is a useful predictor of motivation and learning. The paper concludes with suggestions of ways to foster maintenance and generalization of self-regulated learning and with educational implications of the research findings.

Perceived Self-Efficacy and Related Social Cognitive Processes as Predictors of Student Academic Performance

Current theoretical accounts of learning view students as active seekers and processors of information (Pintrich, Cross, Kozma, & McKeachie, 1986). Learners' cognitions can influence the instigation, direction, and persistence of achievement behaviors (Brophy, 1983; Corno & Snow, 1986; Schunk, in press; Winne, 1985). Research conducted within various theoretical traditions emphasizes students' beliefs concerning their capabilities to control important aspects of their lives (Bandura, 1982; Corno & Mandinach, 1983; Weiner, 1985).

This article focuses on self-regulated learning, which refers to the process whereby students' cognitions manifest themselves in behaviors systematically oriented toward the attainment of academic learning goals. Students' cognitions include such activities as attending to instruction, processing and integrating knowledge, and rehearsing information to be remembered, as well as beliefs concerning capabilities for learning and the anticipated outcomes of learning (Schunk, 1986). The topic of self-regulated learning fits well with the notion that, rather than being passive recipients of information, students exert a large degree of control over the setting and attainment of their learning goals.

For the past few years I have been conducting research on how social and instructional factors associated with learning contexts affect students' self-perceptions, learning, and motivation. The primary self-perception measure that I have studied is perceived self-efficacy, or personal beliefs about one's capabilities to organize and implement actions necessary to attain designated performance levels (Bandura, 1982). Within this context, I have explored the role of self-efficacy as a predictor of motivation and skill acquisition. A key idea is that a sense of self-efficacy for learning can help to explain students' self-regulated learning efforts.

In the following section, I present a brief theoretical overview of the self-efficacy construct, followed by a model of cognitive skill learning. Empirical evidence is summarized showing the effects on self-efficacy and achievement behaviors of social and instructional variables. I then discuss the predictive utility of self-efficacy during cognitive skill learning. The paper concludes with suggestions of ways to foster maintenance and generalization of self-regulated learning and with educational implications of the research findings.

Conceptual Background

The conceptual focus derives from Bandura's (1986) social cognitive learning theory. According to Bandura, self-efficacy can influence choice of activities, effort expenditure, and persistence. Students who hold a low sense of efficacy for accomplishing a task may attempt to avoid it, whereas those who believe they are capable should participate more eagerly. Especially when they encounter difficulties, students who believe that they can perform well ought to work harder and persist longer than those who doubt their capabilities. Individuals assess their self-efficacy for accomplishing a task based on their prior performances, vicarious (observational) experiences, forms of persuasion, and physiological indexes (e.g., heart rate).

Self-efficacy is not an important variable in all situations. Efficacy appraisal typically does not occur for habitual routines or for tasks requiring skills that are well established (Bandura, 1982). In school, self-efficacy beliefs are likely to be more salient and influential when learning is involved than when students are performing previously learned skills. Even in learning contexts, many other variables are important. Cognitive abilities are good predictors of what and how students learn (Corno & Snow, 1986). Outcome expectations are beliefs concerning the outcomes of one's actions. Students are generally more motivated to learn academic content if they believe that teacher praise and good grades will result than if they expect negative outcomes. Also influential is the value students place on outcomes, or their perceived importance. Students who see little value in learning particular content may not be highly motivated even if they feel efficacious about learning and believe that positive outcomes would result (Schunk, in press).

Self-Efficacy and Cognitive Skill Learning

Figure 1 portrays the hypothesized operation of self-efficacy during cognitive skill learning. I previously have discussed aspects of this model (Schunk, 1984a, 1985b, in press). It is derived from different theoretical traditions, including social cognitive learning, attribution, and instructional psychology (Bandura, 1986; Corno & Mandinach, 1983; McCombs, 1984; Weiner, 1985; Winne, 1985).

Insert Figure 1 about here

Entry Characteristics

Students differ in aptitudes and prior experiences. Aptitudes include general abilities, skills, strategies, interests, attitudes, and personality characteristics (Cronbach & Snow, 1977). Educational experiences derive from such influences as prior schools attended, interactions with teachers, and time spent on different subjects. Aptitudes and experiences are related. For example, skilled readers typically perform well on reading tasks, which earns them teacher praise and high grades. In turn, these outcomes may lead students to develop greater interest in reading, which can lead to further skill improvements.

Self-Efficacy for Learning

At the outset of a learning endeavor, we may speak of self-efficacy for learning, acquiring knowledge, developing skills, or mastering material. Aptitudes and prior experiences will affect students' initial beliefs about their learning capabilities. Students who previously have performed well in a content area are apt to believe that they are capable of further learning; students who have experienced difficulties may doubt their capabilities. At the same time, efficacy is not a mere reflection of aptitudes and prior experiences. Collins (1982) found students of high and low mathematical self-efficacy within high, average, and low mathematical ability levels.

Efficacy Cues

While participating in learning activities, students derive cues that signal how well they are learning and that they use to assess efficacy for continued learning. A sense of self-efficacy for learning enhances motivation and skill acquisition.

Performance outcomes are influential cues. Successes generally raise self-efficacy and failures lower it; however, an occasional failure after many successes or one success after many failures should not have much impact (Schunk, in press). Early learning is often fraught with failures, but the perception of progress can promote efficacy; thus, outcome patterns are important. Self-efficacy may not be aided much if students believe that their progress is slow or that their skills have stabilized at low levels.

Attributions, or perceived causes of successes and failures, influence efficacy in important ways. Achievement outcomes often are attributed to such causes as ability, effort, task difficulty, and luck (Frieze, 1980; Weiner, 1985). Children view effort as the prime cause of outcomes and ability as closely associated, but a distinct conception of ability emerges with development (Nicholls, 1978). Ability attributions become increasingly important influences on expectancies, whereas the role of effort declines in importance (Harari & Covington, 1981). Success achieved with great effort should raise efficacy less than if minimal effort is required, because the former implies that skills are not well developed (Bandura, 1982).

Students also derive cues from social comparisons. Festinger (1954) hypothesized that, where objective standards of behavior are unclear or unavailable, observers evaluate themselves through comparisons with others, and that the most accurate self-evaluations derive from comparisons with those who are similar in the ability or characteristic being evaluated. In school, students frequently compare their performances with those of their peers. Students may feel more (less) efficacious when they believe that they are accomplishing more (less) work than most peers. Peers also are important models, and observing models is a form of social comparison. Observing similar peers improving their skills can instill a sense of efficacy for learning, whereas observed failures cast doubt on students' capabilities to succeed (Schunk, 1985b). Similarity can be based on perceived competence or on such personal attributes as age, sex, and ethnic background (Rosenthal & Bandura, 1978).

With respect to persuader credibility, students may experience higher efficacy when they are told they are capable of learning by a trustworthy source (e.g., the teacher), whereas they may discount the advice of less credible sources. Students also may discount otherwise credible sources if they believe that the sources do not fully understand the task demands (e.g., difficult for students to comprehend) or the effect of contextual factors (e.g., too many distractions).

Such bodily symptoms (physiological cues) as sweating and trembling may signal that students are not capable of learning. Students who notice that they are reacting in less-agitated fashion to academic tasks may feel more efficacious about learning.

Task Engagement Variables

Many social and instructional variables can impact students while they are engaged in tasks. This list in Figure 1 is not exhaustive but rather suggestive of influences that seem germane to school learning settings.

The purpose of instruction refers to the uses students believe they will make of the material to be learned (Marx, 1983). For example, when teachers announce that material will be on a test, students who have performed poorly on tests may experience anxiety, which could lead to low efficacy. Students who previously have earned good grades on term papers may react with high efficacy to the announcement that they will have to write a term paper.

Perceived content difficulty may lead to a lower sense of self-efficacy for learning than when students believe material is easier to learn. Students who have trouble processing task information may conclude that they have low ability and thereby feel less efficacious about learning. Salomon (1984) found that students perceive learning from TV to be easier than learning from print, hold higher efficacy for learning from TV, and invest less mental effort in learning. For written materials, self-efficacy relates positively to mental effort.

The instructional context includes such factors as the setting (physical conditions, distractions), the instructional format (whole-class, small-group, individualized), materials, and equipment (videotapes, computers). Students' beliefs about how well they learn under these various conditions can affect efficacy for learning. For example, some students believe that they learn well by themselves, whereas others may perceive greater benefits from small groups.

Instructional events include the teacher's explanations, demonstrations, and reteaching, along with students' activities. Presenting content in ways that students can comprehend is apt to promote a sense of efficacy for learning. Use of instructional time is important; teachers who provide students with multiple task engagement opportunities (practice, review) enhance opportunities to experience success. Teacher assistance can influence efficacy for learning. Teachers who provide much assistance to students may improve their skills but do little to raise their efficacy, because students may believe that they could not succeed on their own. Teachers' expectations for students' learning, which often are conveyed to students, can impact efficacy for learning (Brophy, 1983). Teachers may cue positive (negative) expectations by asserting that students will (may not) enjoy the task and do well on (have difficulty with) it.

Much research shows that students benefit from instruction on strategies, or systematic plans that improve encoding of information and task performance (Baker & Brown, 1984; Paris, Cross, & Lipson, 1984). Strategy instruction can influence self-efficacy. The belief that one understands and can apply an effective strategy can lead to a greater sense of control over learning outcomes, which should promote self-efficacy (Licht & Kistner, 1986; Schunk, in press). At the same time, poor readers often lack conditional knowledge concerning when and why to apply strategies (Myers & Paris, 1978). We have found that providing remedial readers with strategy instruction and strategy value information (information that strategy use improves performance) enhances self-efficacy and skills better than strategy instruction alone (Schunk & Rice, in press).

While learning a strategy, students benefit from verbalizing aloud the component steps as they apply them. Overt verbalization can facilitate learning because it directs students' attention to important task features, assists strategy encoding and retention, and helps students work in a systematic fashion (Schunk, 1985b). Verbalization seems especially helpful for students with learning problems (Borkowski & Cavanaugh, 1979). We found that verbalization of a listening comprehension strategy by remedial readers in grades two through four led to higher self-efficacy across grades, and promoted performance among third and fourth graders but not among second graders (Schunk & Rice, 1984). Perhaps the demands of verbalization, along with those of the comprehension task itself, were too complex for the youngest subjects. These children may have focused on the comprehension task, which would have interfered with strategy encoding and retention. A follow-up study showed that verbalization of a reading comprehension strategy by poor readers in grades four and five enhanced reading comprehension, self-efficacy, and ability attributions across grades (Schunk & Rice, 1985). The latter finding suggests that strategy verbalization may affect self-efficacy through the intervening influence on ability attributions.

We also have compared different forms of verbalization among learning disabled students during mathematics instruction (Schunk & Cox, 1986). Continuously verbalizing a strategy while solving problems led to higher self-efficacy and skill compared with discontinuing verbalization or no verbalization. It is possible that, when instructed to no longer verbalize aloud, discontinued verbalization students had difficulty internalizing the strategy and did not use covert instructions to regulate their performances. A fading treatment, such as that in Meichenbaum's (1977) self-instructional training procedure, may assist with strategy internalization.

When and how teachers provide students with <u>performance feedback</u> can influence self-efficacy. Such statements as, "You're doing much better," can signal that students are making progress in learning, which raises self-efficacy. Teacher feedback is less important when students can derive their own (e.g., self-checking of answers). Students benefit from feedback in situations where progress in learning is unclear.

Exposure to <u>models</u> is an important task engagement variable (Zimmerman, 1977). Perceived similarity of observers to models is a cue used to assess self-efficacy. Models who are similar or slightly higher in competence provide the best information. Students who observe a similar peer learn a task are apt to believe that they can learn as well (Schunk, 1985b). Peer models may raise self-efficacy better than teacher models, especially among students with learning problems who doubt that they are capable of attaining the teacher's level of competence.

Multiple models may enhance perceived similarity because they increase the probability that observers will perceive themselves as similar to at least one of the models (Thelen, Fry, Fehrenbach, & Frautschi, 1979). Coping models also can enhance the perception of similarity. Coping models initially demonstrate the typical fears and deficiencies of observers but gradually improve their performances and gain self-confidence, whereas mastery models demonstrate faultless performance from the outset. Coping models illustrate how determined effort and positive thoughts can overcome difficulties.

These ideas were tested with elementary school children who had experienced learning problems in mathematics (Schunk & Hanson, 1985; Schunk, Hanson, & Cox, 1987). Children observed videotapes portraying an adult teacher and one or more peer (student) models. The teacher repeatedly provided instruction, after which the models solved problems. Some subjects observed peer mastery models easily grasp the operations, solve all problems correctly, and verbalize positive achievement beliefs reflecting high self-efficacy and ability, low task difficulty, and positive attitudes. Others observed coping models initially make errors and verbalize negative achievement beliefs, after which they verbalized coping statements (e.g., "I'll have to work hard on this one") and became more skillful. Eventually their problem-solving behaviors and verbalizations matched those of the mastery models.

Observing peer models enhanced self-efficacy for learning, task motivation and skillful performance, more than observing a teacher model or not observing a model. Schunk and Hanson (1985) found no differential effects of coping and mastery models on children's self-efficacy and skills. Subjects had experienced prior successes with the experimental content (subtraction of whole numbers), and may have drawn on those experiences and focused more on what the models had in common (task success) than on their differences (rate of learning, number of errors, types of verbalization). The Schunk et al. (1987) subjects had few, if any, prior successes with the content (addition and subtraction of fractions). In this study, coping models enhanced achievement outcomes more than observing mastery models, and multiple models - coping or mastery - promoted achievement outcomes as well as a single coping model and better than a single mastery model. Children who observed single models judged themselves more similar in competence to coping models than to mastery models. The benefits of multiple models did not depend on perceived similarity in competence. Similarity in competence may be a more important source of efficacy information when children are exposed to a single model and have a less-diverse set of modeled cues to use in judging self-efficacy.

Goal setting involves comparing one's present performance against a standard. When students pursue a goal, they may experience heightened self-efficacy for attaining it as they observe their goal progress, which helps to sustain task motivation. Goal properties (specificity, proximity) are particularly important (Bandura & Cervone, 1983; Locke, Shaw, Saari, & Latham, 1981). Goals that incorporate specific performance standards are more likely to raise learning efficacy because progress toward an explicit goal is easier to gauge. General goals (e.g., "Do your best") do not enhance motivation. In the context of an instructional program, Schunk (1985a) found that specific (session) performance goals enhanced learning disabled students' mathematics achievement and self-efficacy more than no goals.

Goals also are distinguished by how far they project into the future. Proximal goals, which are close at hand, result in greater motivation than distant goals, because progress toward a proximal goal is easier to gauge. In the context of a mathematical instructional program, we have found that, compared with distal or no goals, proximal goals heighten children's task motivation, self-efficacy, interest, and skillful performance (Bandura & Schunk, 1981; Schunk, 1983b). Distal goals typically result in no benefits over those obtained from receiving instruction.

Attributional feedback, which links students' successes and failures with one or more causes, is a persuasive source of efficacy information. Although ability information becomes more important with development (Nicholls, 1978), effort feedback can motivate students of different ages. Being told that one can achieve better results through harder work (i.e., effort feedback for prior difficulties) can motivate one to do so and convey that one possesses the necessary capability to succeed (Andrews & Debus, 1978; Dweck, 1975). Providing effort feedback for prior successes supports students' perceptions of their progress in learning, sustains motivation, and increases efficacy for continued learning (Schunk, 1985b). Effort feedback may be especially useful for students with learning problems, who often place insufficient emphasis on effort as a cause of success (Torgesen & Licht, 1983).

The timing of attributional feedback also is important. Early task successes constitute a prominent cue used to formulate ability attributions (Weiner, 1974). Feedback that links students' early successes with ability (e.g., "That's correct. You're really good at this") should enhance learning efficacy. Many times, however, effort feedback for early successes may be more credible, because when students lack skills they realistically have to expend effort to succeed. As students develop skills, switching to ability feedback may better enhance self-efficacy.

These ideas have been tested in several studies (Schunk, 1982, 1983a, 1984b; Schunk & Cox, 1986). Schunk (1982) found that linking children's prior achievements with effort (e.g., "You've been working hard") led to higher task motivation, self-efficacy, and subtraction skill, compared with linking their future achievement with effort ("You need to work hard") or not providing effort feedback. Ability feedback for prior successes ("You're good at this") enhances self-efficacy and skill better than effort feedback or ability-plus-effort (combined) feedback (Schunk, 1983a). The latter subjects judged their effort expenditure during the instructional program greater than ability-only students. Children in the combined condition may have discounted some ability information in favor of effort. Schunk (1984b) showed that providing ability feedback for early successes, regardless of whether it was continued or switched to effort feedback, led to higher ability attributions, self-efficacy and skill acquisition, compared with providing effort feedback for early successes. With learning disabled students, effort feedback given either early or late during an instructional program promotes self-efficacy and skillful performance better than no feedback, and early feedback enhances students' effort attributions (Schunk & Cox, 1986). Effort feedback for early or later successes likely seemed credible, because students realistically had to expend effort to succeed. Over time, effort feedback could actually lower efficacy; as students become more skillful they might wonder why they still have to work hard to succeed.

<u>Rewards</u> can promote task performance (Lepper & Greene, 1978), and can enhance self-efficacy when they are tied to students' actual accomplishments. As students work at a task and note their progress, this sense of efficacy is validated. Receipt of the reward further validates self-efficacy, because it

symbolizes progress. When rewards are not tied to actual performance, they actually may convey negative efficacy information; students might infer that they are not expected to learn much because they do not possess the requisite capability. In the context of a long division instructional program, Schunk (1983c) found that performance-contingent rewards led to higher motivation, skill and self-efficacy, compared with task-contingent rewards and unexpected rewards. Offering rewards for participation (task-contingent) led to no benefits over those due to receiving instruction.

Predictive Utility of Self-Efficacy

We typically have assessed self-efficacy for learning prior to the onset of an instructional program. The predictive utility of this measure can be determined by relating it to the number of problems that children complete during the independent practice portions of instructional sessions. Significant and positive correlations have been obtained (range of *r*s = .33 - .42). More rapid problem solving has not been attained at the expense of accuracy. Similar correlations have been obtained using the proportion of problems solved correctly. Self-efficacy for learning also relates positively to posttest self-efficacy and skill (range of *r*s = .46 - .90).

The predictive utility of self-efficacy assessed during a pretest, which reflects students' present capabilities, is often inadequate because subjects lack skills and judge efficacy low. In contrast, there is greater variability in posttest measures of efficacy and skill. Studies in different domains have yielded significant and positive correlations between posttest efficacy and skill (range of *r*s = .27 - .84).

Multiple regression has been used to determine the percentage of variability in skillful performance accounted for by self-efficacy. These analyses show that perceived efficacy accounts for a significant increment in the variability in posttest skill; R^2 values range from .17 to .24. Schunk (1981) employed path analysis to test how well a causal model of achievement reproduced the original correlation matrix comprising instructional treatment, self-efficacy, persistence, and skill. The most parsimonious model that reproduced the data showed that treatment exerted both a direct effect on skill and an indirect effect through persistence and efficacy, that the effect of treatment on persistence operated indirectly through efficacy, and that efficacy influenced skill and persistence.

Maintenance and Transfer

Strategy instruction research often shows that students often do not maintain their use of strategies or transfer them outside of the experimental context (Borkowski & Cavanaugh, 1979). Amount of instruction can influence maintenance and transfer of self-regulated learning processes. Especially among students who previously have encountered problems learning academic content, a few successes while learning complex cognitive skills during a short experimental program may not be sufficient to alter students' beliefs about their learning capabilities. A related factor is the level of students' performances during the intervention. Given that there are motivational differences between students, those who believe they have made only modest progress during an instructional program may not feel very efficacious about their learning capabilities regardless of the length of instruction.

Maintenance and transfer can be enhanced by incorporating multiple tasks into the intervention (Borkowski & Cavanaugh, 1979). Students who receive instruction on a single task presented in the same format may doubt their capabilities to learn related content presented in other ways. Instruction on a learning rategy can foster the perception that it is appropriate for specific tasks. Students may not understand that the strategy can be modified for use on related tasks, or how to do so. Explicit training on strategy modification may be necessary.

Maintenance and transfer depend in part on students' attributions for their successes during an experimental intervention. Attributions of success to such external factors as task ease or good luck will not produce a robust sense of efficacy. While learning strategies are being taught, providing effort or ability feedback may help to build a strong sense of efficacy.

Strategy instruction research shows that students often believe that, although a strategy is useful, such other factors as effort expended and time available are more important influences on their achievement (Fabricius & Hagen, 1984). Strategy value information conveys the importance of the strategy by linking students' use of it with their successes (e.g., "You got it right because you applied the steps in the correct order"). Strategy value information seems especially helpful with low achievers who may not discern the link between strategy use and improved performance (Schunk & Rice, in press).

Students with learning problems often benefit from verbalizing aloud while acquiring skills, because verbalization can promote task attention, rehearsal, and coding of information (Schunk, 1986). Given that the transfer setting is unlikely to allow for verbalization, having students discontinue verbalization during the experimental program seems desirable; however, simply instructing them to do so may lead them to discontinue strategy use (Schunk & Cox, 1986). The use of a fading procedure in which verbalizations are shifted from an overt (aloud) to a covert (whispering, lip movements) level often proves helpful (Meichenbaum & Asarnow, 1979).

An excellent means of promoting maintenance and transfer of self-regulated learning processes is to employ actual classrooms in research studies. A future agenda might well include teachers as active research collaborators. Another benefit is that by working with teachers, researchers can study how students' self-efficacy and learning goals change over the course of a semester or school year, and how well these changes relate to students' self-regulated learning efforts.

Educational Implications

Many of the procedures described in this paper can be easily implemented by teachers. For example, in our comprehension studies we incorporated the experimental procedures into small reading groups (Schunk & Rice, 1984, 1985, in press). Teaching students to use a comprehension strategy by having them verbalize steps is easily implemented during small group instruction, and fits well with the suggestion that students be given explicit instruction on learning strategies (Brown, Palincsar, & Armbruster, 1984; Paris et al., 1984; Raphael & McKinney, 1983). One of us (Rice) has taught the comprehension strategy to teachers of remedial readers in the school district.

These procedures also apply to seatwork activities. Performance feedback that signals progress in learning validates students' beliefs that they are acquiring skills, and can enhance motivation for further learning. It is important that attributional feedback be viewed as credible by students. Effort feedback for success at a task that students believe is easy may lead them to wonder whether the teacher thinks they are low in ability (Weiner, Graham, Taylor, & Meyer, 1983). Similarly, students may discount ability feedback after they have had to struggle to succeed.

Goal setting can be incorporated in various ways. Teachers have lesson goals for students. Contingency contracts specify learning or performance goals. Goal-setting conferences, in which teachers meet periodically with students to discuss their goal attainment and to set new goals, enhance achievement and capability self-evaluations (Gaa, 1973). Short-term goals are maximally motivating with young children, and may be especially beneficial for students with learning problems because they provide concrete standards against which to gauge progress.

Peer models seem especially useful for children with learning problems who may doubt their learning capabilities. Observation of an adult teacher flawlessly demonstrating cognitive skills may teach students skills but not help to build efficacy for learning. Observing similar peers successfully perform a task can raise self-efficacy in students because they are apt to believe that if the peers can learn, they also can improve their skills. Peers also could model such coping behaviors as increased concentration and hard work. While students are engaged in seatwork, teachers can provide social comparative information (e.g., "See how well Kevin is doing? I'm sure that you can do just as well"). Teachers need to ensure that learners will view the comparative performances as attainable; judicious selection of referent students is necessary.

Peers also can enhance observers' self-efficacy in small groups. Successful groups in which each member is responsible for some aspect of the task and members share rewards based on their collective performance can reduce negative ability-related social comparisons (Ames, 1984). Teachers need to carefully select tasks, because unsuccessful groups will not raise efficacy.

The use of peers as instructional agents has most commonly occurred in tutoring programs. Peer instructors also are helpful where their teaching strategies fit well with learners' capabilities or the skills being taught. Adult teachers typically employ more verbal instruction and relate information to be learned to other material, whereas peer teachers tend to use nonverbal demonstrations and link instruction to specific items (Ellis & Rogoff, 1982). Peer instruction seems beneficial for students with learning problems and other learners who may not process verbal material particularly well.

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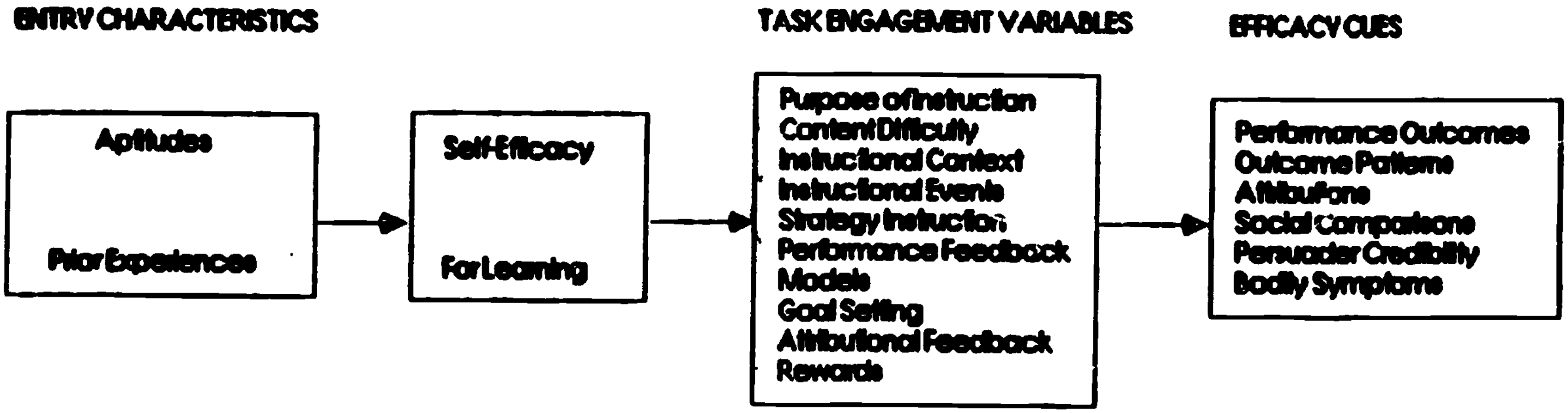
Figure Caption

Figure 1. Self-efficacy model of cognitive skill learning.


ENTRY CHARACTERISTICS
Aptitudes
Prior Experiences
Self-Efficacy
For Learning
TASK ENGAGEMENT VARIABLES
Purpose of Instruction
Content Difficulty
Instructional Context
Instructional Events
Strategy Instruction
Performance Feedback
Models
Goal Setting
Attributional Feedback
Rewards
EFFICACY CUES
Performance Outcomes
Outcome Patterns
Attributions
Social Comparisons
Persuader Credibility
Bodily Symptoms