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ABSTRACT

This paper reviews self-efficacy research with special emphasis on students in school. Bandura's emphasis on domain-specific assessment is useful for understanding student learning and fits well with current research on instructional processes. A self-efficacy model of student learning is presented, comprising entry characteristics, self-efficacy for learning, task engagement variables, and efficacy cues. At the outset of learning tasks, students vary in their self-efficacy for learning. As they work on tasks, they derive cues from task engagement variables that signal how well they are learning; they use these cues to assess efficacy for continued learning. Research is summarized on the effects of some task engagement variables associated with the instructional and social context of learning. Empirical evidence supports the idea that self-efficacy is a useful predictor of student motivation and learning. The article concludes with a discussion of substantive issues involved in applying self-efficacy theory to learning settings, e.g., performance, motivation, and outcomes. A figure illustrating the self-efficacy model and an extensive six-page bibliography are appended. (Author/MAC)

Self-Efficacy and Cognitive Achievement

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Abstract

This article reviews self-efficacy research in cognitive skill learning contexts. Bandura's emphasis on domain-specific assessment is useful for understanding student learning and fits well with current research on instructional processes. A self-efficacy model of student learning is presented comprising entry characteristics, self-efficacy for learning, task engagement variables, and efficacy cues. At the outset of learning tasks, students vary in their self-efficacy for learning. As they 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 on the effects of some task engagement variables associated with the instructional and social context of learning. Empirical evidence supports the idea that self-efficacy is a useful predictor of student motivation and learning. The article concludes with a discussion of substantive issues involved in applying self-efficacy theory to learning settings.

Self-Efficacy and Cognitive Achievement

In the 10 years since Bandura's (1977a, 1977b) original writings on self-efficacy, there have been diverse applications as indicated by this symposium. An important application has been to the area of cognitive achievement: learning, motivation, academic performance. This article reviews some of this self-efficacy research with special emphasis on students in school.

Bandura's emphasis on examining behavioral changes within specific domains reflects a growing trend within the field of education. As with the study of personality processes (Mischel, 1968), educational researchers have frequently found that general measures of human characteristics do not consistently predict students' achievements in school. An example is self-concept research. Self-concept refers to one's collective self-perceptions formed through experiences with and interpretations of the environment and heavily influenced by reinforcements and evaluations by significant others. Correlations between general self-concept and measures of academic achievement are often low and nonsignificant. Better prediction is obtained with measures of academic self-concept (Wylie, 1979). More recently, researchers have characterized self-concept as multifaceted and hierarchically organized (Shavelson & Bolus, 1982). Self-perceptions of specific behaviors presumably influence subarea self-concepts (e.g., English, mathematics), which in turn combine to form the academic self-concept (Marsh & Shavelson, 1985). The general self-concept is formed by self-perceptions in the academic, social, emotional, and physical domains. Higher correlations between academic achievement and subject area self-concepts have been obtained than between achievement and academic self-concept.

This is not to suggest that general measures cannot predict academic achievement. Standardized intelligence tests typically show positive and often high intercorrelations with school achievement (Snow & Lohman, 1984). Measures of specialized abilities (e.g., verbal, mathematical) predict student learning in the appropriate content area. At the same time, complex constellations of aptitudes often predict student learning better than any aptitude alone (Corno & Snow, 1986). Current instructional theories view learning as a complex process comprising instructional, social, and learner variables (Pintrich, Cross, Kozma, & McKeachie, 1986).

In various domains, differentiated conceptions are replacing general constructs. Factor analytic theory has replaced the unidimensional g intelligence construct with fluid (analytic), crystallized (verbal - educational), and visualization (figural - spatial) abilities (Snow & Lohman, 1984). Sternberg (1985) proposed a triarchic theory of intelligence comprising metacomponents that exert executive control, performance components that implement the plan specified by metacomponents, and knowledge acquisition components that select and encode new information. In Gardner's (1983) view, intelligence includes such aspects as language, mathematics, music, and kinesthetics.

In the following section, I present theoretical principles and a self-efficacy model of school achievement. Some empirical evidence is given for the predictive utility of self-efficacy during cognitive skill learning and for the effects on self-efficacy of task engagement variables. The article concludes with a discussion of substantive issues.

Self-Efficacy Theory and Research

Conceptual Framework

Self-efficacy refers to students' beliefs concerning their capabilities to organize and implement actions necessary to attain designated performance levels (Bandura, 1986). Self-efficacy is hypothesized to affect choice of activities. 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. Self-efficacy also is hypothesized to affect effort expenditure and persistence. 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 (Bandura, 1982b).

Individuals acquire information to assess self-efficacy from their actual performances, vicarious experiences, forms of persuasion, and physiological indexes. In general, one's successes raise efficacy and failures lower it, although once a strong sense of efficacy is developed an occasional failure may not have much impact. In school, students who observe similar peers perform a task may believe that they, too, are capable of performing it. Information acquired vicariously ought to have a weaker influence on efficacy than performance-based information, because a vicarious increase in efficacy can be negated by subsequent failure. Students receive persuasory information from teachers (e.g., "You can do this"). Positive persuasory feedback can enhance efficacy, but this increase is apt to be short-lived if students' subsequent efforts turn out poorly. Students also derive efficacy information from such physiological indexes as heart rate and sweating. Anxiety symptoms can convey that one lacks the skills necessary to perform well.

Information acquired from these sources does not influence self-efficacy automatically but rather is cognitively appraised (Bandura, 1982b). Efficacy appraisal is an inferential process in which persons weigh and combine the contributions of such personal and situational factors as perceived ability, task difficulty, amount of effort expended, amount of external assistance received, task outcomes, patterns of successes and failures, perceived similarity to models, and persuader credibility.

Self-Efficacy and Cognitive Skill Learning

Figure 1 portrays the hypothesized operation of self-efficacy during cognitive skill learning. I have discussed aspects of this model elsewhere (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 prior schools attended, interactions with teachers, and time spent on different subjects. These two factors are related. For example, students high in reading ability usually 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 improve their ability.

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 subject area ought to believe that they are capable of further learning, whereas students who have experienced difficulties may doubt their capabilities. At the same time, efficacy is not a mere reflection of aptitudes and prior experiences. Using students of high, average, and low mathematical ability, Collins (1982) found students of high and low mathematical self-efficacy within each ability level. Students solved problems and could rework those they missed. Ability was positively related to skillful performance, but regardless of ability level, students with higher efficacy solved more problems correctly and chose to rework more that they missed.

Efficacy cues. While participating in learning activities, students derive various cues that signal to them how well they are learning and that they use to assess efficacy for continued learning. In turn, higher efficacy for learning enhances motivation and skill acquisition.

Performance outcomes influence efficacy in that successes generally raise it and failures lower it; however, an occasional failure after many successes may not have much impact, nor should one success after many failures (Schunk, in press). Early learning is often fraught with failures, but the perception of progress can promote efficacy. With respect to outcome patterns, 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-related terms as closely associated, but with development a distinct conception of ability emerges (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, 1982b).

Students also derive cues from the learning context. Teachers who assist students may improve their skills but not help raise their efficacy if students believe that they cannot succeed on their own. Teacher praise conveys how the teacher views student abilities (Weiner, Graham, Taylor, & Meyer, 1983). When students believe that a task is easy, praise combined with effort information (e.g., "That's good. You've been working hard") signals low ability. Other contextual factors include grouping for instruction, instructional materials, and classroom conditions (e.g., heat, light).

Model similarity is used to appraise efficacy. Observing similar peers improving their skills can instill a sense of efficacy in students for learning, whereas observed failures cast doubt on students' capabilities to succeed (Schunk, 1985b). Similarity can be based on perceived competence or such personal attributes as age, sex, and ethnic background (Rosenthal & Bandura, 1978).

Persuader credibility is important because 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 nature of the task demands (e.g., difficult for students to comprehend) or the effect of contextual factors (e.g., too many distractions).

Bodily symptoms serve as physiological cues for appraising efficacy. 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

Task engagement refers to students' cognitive activities (i.e., attending, processing and integrating information, thinking and problem solving), as well as their verbalizations and behaviors (Brophy, 1983; Corno & Mandinach, 1983). Shown in Figure 1 are some task engagement variables that I believe have important effects on students' self-efficacy. This list is not exhaustive but rather suggestive of influences that seem germane to school learning settings.

The purpose of instruction refers to the uses students will make of the material to be learned (Marx, 1983). 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 can negatively affect efficacy for learning, whereas material that students believe is easy to learn should result in high efficacy. Efficacy for learning also should be affected by the type of cognitive processing required by the content. Students who have trouble processing information required by a task may conclude that they have low ability and feel less efficacious about learning. Salomon (1984) has shown 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.

Strategy training can influence self-efficacy. The belief that one understands and can effectively apply a strategy leads to a greater sense of control over learning outcomes, which can promote efficacy (Bandura, 1982a; Licht & Kistner, 1986). In learning a strategy, students benefit from verbalizing aloud the component steps while applying them to a task. 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 may be most beneficial for students who typically perform in a deficient manner (Borkowski & Cavanaugh, 1979).

Schunk and Rice (1984, 1985) found that verbalization of listening and reading comprehension strategies enhanced language-deficient children's self-efficacy and skill development better than not verbalizing strategies. Schunk and Cox (1986) compared the effects of different forms of verbalization among learning disabled students during mathematics instruction. Continuously verbalizing a strategy while solving problems led to higher self-efficacy and skill compared with discontinuing verbalizations or not verbalizing. It is possible that, when instructed to no longer verbalize aloud, discontinued verbalization students had difficulty internalizing the strategy and may not have used covert instructions to regulate their performances. A fading treatment, such as that used in Meichenbaum's (1977) self-instructional training procedure, may assist with strategy internalization.

Instructional presentation should affect self-efficacy. Teachers who present material in a fashion that students can comprehend are apt to engender high efficacy. Use of instructional time also may be important. Teachers who provide students with multiple opportunities for task engagement (instruction, practice, review) enhance opportunities to experience success. Teaching methods ought to be influential: Some students learn better from lectures, others from discussions. In judging self-efficacy, students may consider the instructional method along with the content.

As part of their presentations, teachers often convey to students their expectations. Teachers may cue positive (negative) expectations by asserting that students will enjoy (not enjoy) the task and do well (poorly) on it (Brophy, 1983). These statements, coming from a credible judge of student abilities, should impact students' efficacy.

When and how teachers provide students with performance feedback can influence self-efficacy. Teacher feedback is less important when students can derive their own feedback, such as by checking answers. Students benefit from feedback in situations where progress in learning is unclear.

Student modeling occurs not only as a consequence of teachers explaining and demonstrating skills but also when students socially compare their performances with those of their peers. Perceived similarity of observers and models can be important. Models who are similar or slightly higher in competence provide the best information for assessing one's own capabilities. Students who observe a similar peer learn a task are apt to believe that they can learn as well (Schunk, 1985b). Peer models may exert more beneficial effects on self-efficacy than teacher models, especially among low achievers who may doubt that they are capable of attaining the teacher's level of competence.

One way to enhance perceived similarity is to use multiple models, which increase the probability that observers will perceive themselves as similar to at least one of the models (Thelen, Fry, Fehrenbach, & Frautschi, 1979). Another way is to use coping rather than mastery models. Coping models initially demonstrate the typical fears and deficiencies of observers but gradually improve their performance and gain confidence in their capabilities, whereas mastery models demonstrate faultless performance and high confidence from the outset (Kazdin, 1978). Coping models illustrate how determined effort and positive self-thoughts can overcome difficulties.

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

Observing peer models enhanced self-efficacy for learning, along with posttest self-efficacy and skillful performance, more than observing a teacher model or not observing a model. Observing coping models enhanced achievement outcomes more than observing mastery models when children had experienced few, if any, prior successes in their classes on the mathematical operations. 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. A sense of learning efficacy helps sustain task motivation. Goals exert their effects through their properties: specificity, difficulty level, proximity (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 performance goals -

whether self-set or set by teachers - enhanced learning disabled students' mathematics achievement and self-efficacy more than no goals.

Goal difficulty refers to the level of task proficiency required as assessed against a standard. Although students initially may doubt their capabilities to attain goals they believe are difficult, working toward difficult goals can build a strong sense of efficacy, because they offer more information about learning capabilities than easier 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 more distant goals. As students observe their progress toward a proximal goal, they are apt to believe that they are capable of further. During an instructional program, Schunk (1983b) found that providing students with proximal goals enhanced their mathematical self-efficacy more than no goals. Bandura and Schunk (1981) found that, compared with distal or no goals, proximal goals heightened children's task motivation, and led to the highest mathematical self-efficacy, interest, and skillful performance. Distal goals resulted in no benefits over those obtained from receiving the instructional program.

<u>Rewards</u> can promote task performance (Lepper & Greene, 1978), and can enhance self-efficacy when they are tied to students' actual accomplishments. Telling students that they can earn rewards based on what they accomplish can instill a sense of efficacy for learning. 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 more rapid problem solving during training, as well as higher 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 participating in the instructional program.

Attributional feedback, which links students' successes and failures with one or more causes, is a persuasive source of efficacy information. Being told that one can achieve better results through harder work 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). Ability information becomes more important with development (Nicholls, 1978).

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. Schunk (1983a) showed that ability feedback for prior successes ("You're good at this") enhanced self-efficacy and skill better than effort feedback or ability + effort (combined) feedback. 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.

To investigate sequence effects, Schunk (1984b) periodically provided one group of children with ability feedback, a second group with effort feedback, and a third condition with ability feedback during the first half of training and effort feedback during the second half. This latter sequence was reversed for a fourth condition. Providing ability feedback for early successes, regardless of whether it was continued, led to higher ability attributions, posttest self-efficacy and skill, compared with providing effort feedback for early successes.

In the Schunk and Cox (1986) study, students received effort feedback during the first half of the instructional program, effort feedback during the second half, or no effort feedback. Each type of feedback promoted self-efficacy and skillful performance better than no feedback; feedback during the first half of training enhanced students' effort attributions. Given students' learning disabilities, effort feedback for early or later successes may have seemed credible, because they realistically had to expend effort to succee Over time, effort feedback could actually lower efficacy, because as students become more skillful they might wonder why they still have to work hard to succeed.

Predictive Utility of Self-Efficacy

The predictive utility of self-efficacy for learning can be determined by relating this measure to the number of problems that children complete during the independent practice portions of training sessions (Schunk, 1987). Significant and positive correlations have been obtained (range of rs = .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 rs = .46 - .90).

The predictive utility of pretest efficacy 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 rs = .27 - .84).

Multiple regression has been used to determine the percentage of variability in skillful performance accounted for by self-efficacy (Schunk, 1987). 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.

Substantive Issues

Learning Versus Performance

Early self-efficacy research by Bandura and his colleagues used treatments designed to help subjects overcome phobias. This research did not clearly distinguish between skill learning and the performance of previously learned behaviors. Activities such as approaching and touching a snake involve behaviors that people know how to perform but typically do not because of such factors as anxiety and negative outcome expectations. Treatments that promote people's interactions in feared situations do so by raising their self-efficacy for successfully managing threatening activities.

Some school activities involve performance of previously learned skills, but much time is spent on cognitive skill learning. Self-efficacy should influence new learning as well as the performance of previously learned skills. In assessing self-efficacy for learning, students use their metacognitive skills to determine what they will need to learn, what knowledge and skills are prerequisites for the new learning, how well they can recall the prerequisite information from memory, how easily they have learned similar skills in the past, how well they can attend to the teacher's instruction and rehearse material to be learned, and how skillfully they can monitor their level of understanding. Self-efficacy for learning, then, involves assessing what will be required in the learning context and how well one can use one's knowledge and skills to produce new learning.

Self-Efficacy and Motivation

Self-efficacy is hypothesized to manifest itself in choice of activities, persistence, effort expenditure, and task accomplishments (Bandura, 1982b). These behaviors seem reasonable in contexts requiring performance of previously learned skills. When efficacy is applied to classroom learning situations, however, some modification is needed. Choice of activities is not a good index of motivation in school because students typically do not choose whether to participate in learning activities (Brophy, 1983). Choice of activities is meaningful only under a limited set of conditions (e.g., free time).

Similarly, high efficacy may not always lead to greater persistence. At the outset of a learning activity, students may persist at tasks because of high efficacy for learning but also because teachers keep them working on the task. As skills develop we might expect that self-efficacy would bear a negative, rather than a positive, relationship to persistence; students should not have to persist as long to correctly answer questions or solve problems. In cognitive skill learning contexts, research has yielded persistence-efficacy correlations ranging from +.30 to -.29 (Schunk, 1987).

Where skill learning is involved, cognitive effort seems to be an appropriate index of motivation (Corno & Mandinach, 1983). A large part of students' time during instruction is spent attempting to understand the content (Peterson, Swing, Braverman, & Buss, 1982). Students with higher efficacy for learning ought to expend greater mental effort during instruction on activities that they believe will promote learning, such as rehearsing information and monitoring their level of understanding.

Self-Efficacy and Outcomes

Successes should raise self-efficacy and failures should lower it. To accurately judge efficacy, people must be able to distinguish successes from failures. In situations requiring performance of previously learned skills, individuals usually can determine whether they have succeeded or failed.

Judging efficacy in cognitive skill learning contexts is more complex. Students may learn some component subskills of a task but not others. Students who are unaware of the full range of task demands could misjudge efficacy due to incomplete information. In mathematics, students often employ buggy algorithms, or erroneous strategies that result in problem solutions (Brown & Burton, 1978). Because buggy algorithms produce solutions, employing them may lead to a false sense of competence, especially in the absence of teacher feedback. Similarly, students who solve problems correctly but are unsure of whether their answers are correct may not feel more efficacious. Feedback to students concerning their progress in learning is important when students cannot determine progress on their own.

In summary, there is much evidence that self-efficacy is an important variable in explaining achievement behaviors in cognitive skill learning settings. At the same time, additional research is needed. Many of the points discussed in this article require empirical investigation. I also would urge researchers to conduct studies in actual classrooms to determine how various contextual factors influence students' self-efficacy and how efficacy changes over time. Such research would not only contribute to our theoretical understanding but also would have important implications for educational practices.

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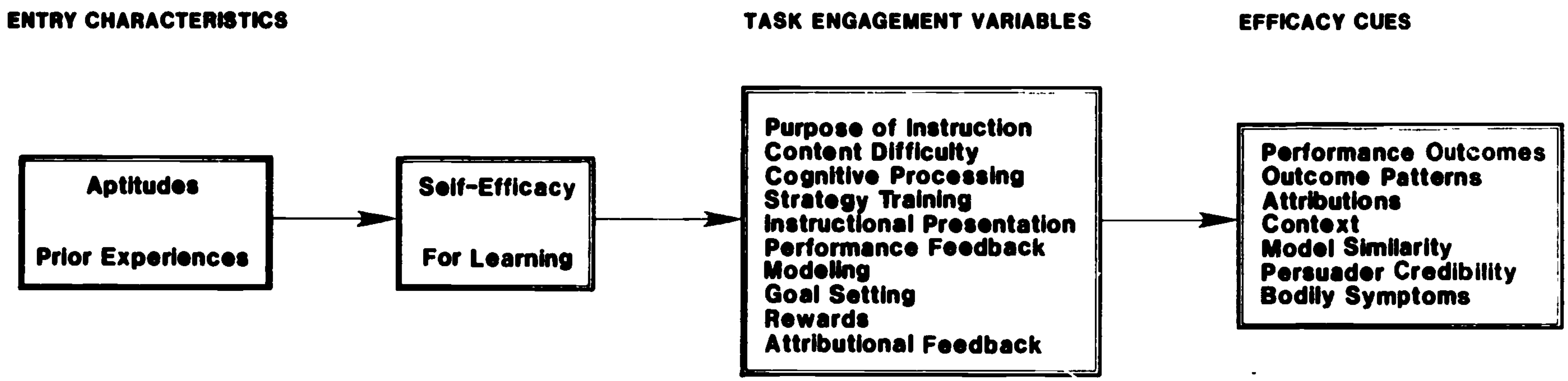
Figure Caption

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


ENTRY CHARACTERISTICS
TASK ENGAGEMENT VARIABLES
EFFICACY CUES
Aptitudes
Prior Experiences
Self-Efficacy
For Learning
Purpose of Instruction
Content Difficulty
Cognitive Processing
Strategy Training
Instructional Presentation
Performance Feedback
Modeling
Goal Setting
Rewards
Attributional Feedback
Performance Outcomes
Outcome Patterns
Attributions
Context
Model Similarity
Persuader Credibility
Bodily Symptoms