Self-Efficacy, Motivation, and Performance

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Abstract:

This article discusses the relation of self-efficacy to motivation and performance in cognitive and sport domains, Self-efficacy refers to one's beliefs about accomplishing a task and can influence choice of activities, effort, persistence, and achievement. People enter activities with varying levels of self-efficacy derived fund prior experience, personal qualities, and social support. As they work on tasks they acquire information about how well they are doing. This information influences their self-efficacy for continued learning and performance. Research is described in which interventions involving models, goal setting, and feedback, were employed to affect self-efficacy. Regardless of domain, research shows that self-efficacy helps to predict motivation and performance, and studies testing causal models highlight the important role played by self-efficacy. Suggestions for future research are given, along with implications of theory and research for education and training.

Article:

The role of self-efficacy in motivation and performance has been increasingly explored since Bandura's (1977a, 1977b) original publications. *Self-efficacy* refers to, "People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1986, p. 391). Stated differently, we might say that self-efficacy involves one's beliefs about accomplishing a task. Research shows that self-efficacy predicts such outcomes as cognitive skill learning, smoking cessation, pain tolerance, athletic performance, career choices, assertiveness, coping with feared events, recovery from heart attack, and sales performance (Bandura, 1986; Maddux, 1993; Schunk, 1989).

This article focuses on the relation of self-efficacy to motivation and performance in the cognitive and sport domains. Initially I present an overview of self-efficacy theory to include causes and consequences of self-efficacy. I then discuss research on three types of interventions de-signed to affect self-efficacy: models, goal setting, feedback. Some evidence is provided on the utility of self-efficacy as a predictor of behavior. The article concludes with future research directions and implications of research findings for education and training.

Self-efficacy Theory

Bandura (1977a) hypothesized that self-efficacy affects choice of activities, effort, persistence, and achievement. Compared with persons who doubt their capabilities, those with high self-efficacy for accomplishing a task participate more readily, work harder, persist longer when they en-counter difficulties, and achieve at a higher level.

People acquire information to appraise self-efficacy from their performances, vicarious (observational) experiences, forms of persuasion, and physiological reactions. One's performances offer reliable guides for assessing self-efficacy. Successes raise efficacy and failures lower it, but once a strong sense of efficacy is developed a failure may not have much impact (Bandura, 1986).

People also acquire self-efficacy information from knowledge of others through social comparisons. Those who observe similar peers perform a task are apt to believe that they, too, are capable of accomplishing it. To remain credible, however, information acquired vicariously requires validation by actual performance.

We often receive persuasive information from others that we are capable of performing a task (e.g., "You can do this"). Such positive feedback can enhance self-efficacy, but this increase will be temporary if subsequent efforts turn out poorly. Individuals also acquire efficacy in-formation from physiological reactions (e.g., heart rate, sweating). Symptoms signaling anxiety might be interpreted to mean one lacks skills.

Self-efficacy is not the only influence on behavior. High self-efficacy will not produce a competent performance when requisite *knowledge* and *skill* are lacking. In this instance, a sense of *self-efficacy for learning* is beneficial because it motivates individuals to improve their competence, *Outcome expectations,* or beliefs concerning the probable outcomes of actions, are important because people strive for positive outcomes. Out-come expectations and self-efficacy often are related. Efficacious learners expect and usually receive positive outcomes for their actions. There is, however, no automatic relation between the two. Students may expect positive outcomes as a result of performing well on a test or at a track meet but may doubt their capabilities of attaining a high level of performance. This point is important because self-efficacy and outcome expectancies occasionally are confused in the literature. Finally, *value of outcomes,* or how much individuals desire certain outcomes relative to others, affects behavior because people are motivated to act in ways they believe will result in outcomes that are self-satisfying.

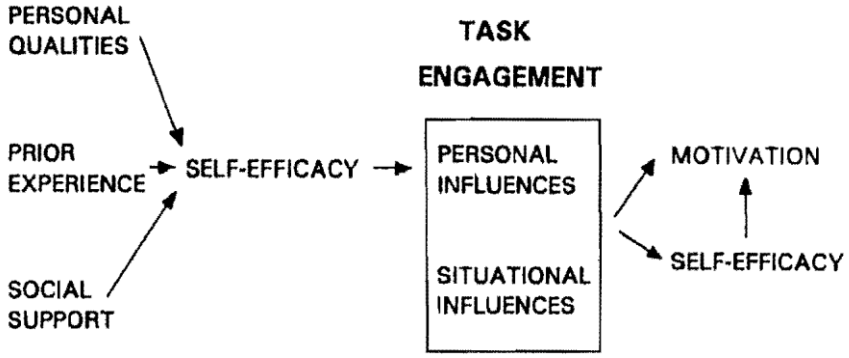

Figure 1. Model of achievement behavior highlighting the role of self-efficacy.

The role of self-efficacy in behavioral change is highlighted in the model shown in Figure 1. At the start of an activity, individuals differ in their self-efficacy for learning or performing actions as a function of their prior experience at the same or similar activities and such personal qualities as abilities and attitudes. Initial self-efficacy also is affected by the type of support persons receive from significant individuals in their environment. Students differ, for example, in the extent that parents and teachers encourage them to develop skills, facilitate their access to resources necessary for learning (e.g., materials, facilities), and teach them self-regulatory strategies that enhance skill acquisition and refinement (Ericsson, Krampe, & Tesch-Romer, 1993).

As people engage in activities, they are affected by such personal influences as goal setting and information processing, along with situational factors (e.g., rewards, teacher feedback). From these factors people derive cues signaling how well they are performing. Motivation and self-efficacy are enhanced when people perceive they are performing skillfully or becoming more competent. Lack of success or slow progress will not necessarily lower self-efficacy and motivation if individuals believe they can perform better by adjusting their approach (e.g., expend more effort, use effective task strategies) (Schunk, 1989).

Interventions Designed to Affect Self-Efficacy

In this section I summarize some research on three types of interventions designed to influence self-efficacy: models, goal setting, feedback. What follows is neither exhaustive nor comprehensive. These factors were selected because they are relevant to cognitive and sport domains. Space constraints prevent my discussing relevant research in other domains (e.g., health) or other potentially important factors (rewards, social

comparisons). Interested readers may wish to consult other sources (Bandura, 1986, in press; Maddux, 1993; Maddux, Brawley, & Boykin, in press; Schunk, 1989; Strecher, DeVellis, Becker, & Rosenstock, 1986).

Models

Models provide an important vicarious source of self-efficacy information (Bandura, 1986). Observing competent models successfully per-form actions conveys information to observers about the sequence of actions one should use to succeed. Modeled displays convey that observers are capable of learning or accomplishing the task if they follow the same sequence of actions. The belief that one knows what to do to perform a task raises self-efficacy, and this vicarious increase can motivate observers to perform the task (Schunk, 1989).

Research shows that models can have profound effects on self-efficacy, motivation, and achievement. In the context of a long-division instructional program, Schunk (1981) provided low-achieving children with either cognitive modeling or didactic instruction. For the cognitive modeling, children observed an adult model explain division operations and apply them to sample problems. Following this modeled exposure, children received guided practice as they solved problems and received corrective instruction from the models as necessary. Children then solved problems alone during independent practice. In the didactic condition, children reviewed instructional material that explained and exemplified division operations, after which they received guided and independent practice. Before and after instruction children's division skill, persistence, and self-efficacy for solving different types of division problems were assessed.

Cognitive modeling and didactic instruction raised self-efficacy equally well; however, modeling led to greater gains in division skill and to more accurate perceptions of capabilities as these children's efficacy judgments corresponded more closely to their actual performances. Didactic subjects tended to overestimate what t.hey could do. Regardless of treatment condition, self-efficacy related positively to persistence and achievement. As will be discussed later, path analysis showed that self-efficacy mediated the relation between instructional treatment and division performance.

Other achievement research supports the influence of models on self-efficacy. Zimmerman and Ringle (1981) had children observe a model unsuccessfully attempt to solve a puzzle for a long or short time and verbalize statements of confidence or pessimism, after which children attempted the puzzle themselves. Observing a low-persistent but confident model raised self-efficacy; children who observed a pessimistic model persist for a long time lowered their self-efficacy. Relich, Debus, and Walker (1986) found that exposing low-achieving children to models explaining mathematical division and providing them with feedback stressing the importance of ability and effort had a positive effect on self-efficacy.

Perceived similarity to models is an important attribute. Observing similar others succeed can raise observers' self-efficacy and motivate them to try the task because they are apt to believe that if others can succeed, they can as well (Schunk, 1987), Similarity may be especially influential when individuals are uncertain about their capabilities, such as when they lack task familiarity and have little information to use in judging efficacy or when they previously experienced difficulties and have doubts about performing well.

Similarity may be varied through the use of coping and mastery models. *Coping models* initially demonstrate the typical behavioral deficiencies and possibly fears of observers but gradually improve their performances and gain self-confidence. These models illustrate how effort and positive thoughts can overcome difficulties. *Mastery models* demonstrate faultless performance from the outset (Schunk, 1987).

Schunk and Hanson (1985) had low-achieving children observe videotapes of peer mastery or coping models or adult teacher models explaining and demonstrating subtraction operations. Peer mastery models solved problems correctly and verbalized statements reflecting high self-efficacy and ability, low task difficulty, and positive attitudes. Peer coping models initially made errors and verbalized negative statements, but then began to verbalize coping statements (e.g., "I need to pay attention to what I'm doing") and eventually verbalized and performed as well as mastery models. Teacher models displayed mastery behaviors. Other children did not

observe models. Following this modeling phase all children judged self-efficacy for learning to solve problems, received subtraction instruction and practice solving problems over sessions, and a posttest on self-efficacy and skill.

Peer models increased self-efficacy for learning and posttest self-efficacy and skill better than the teacher model or no model; teacher-model children outperformed no-model students. All model conditions displayed higher motivation than did no-model subjects based on the number of problems solved during the instructional sessions. Schunk and Hanson hypothesized that subjects might perceive themselves more similar to coping models, but the mastery- and coping-model conditions did not differ. Subjects may have recalled instances of prior successful performance in subtraction and believed that if the models could learn, they could too.

Schunk, Hanson, and Cox (1987) employed a similar methodology but used an arithmetic task (fractions) on which children had experienced few previous successes. These researchers also tested the idea that multiple models are better than a single model because multiple models increase the likelihood that students will view themselves similar to at least one model (Schunk, 1989). The first study showed that benefits of coping models were obtained with a more-difficult task: Observing a coping model enhanced self-efficacy for learning, motivation, and posttest self-efficacy and skill, more than did observing a mastery model. In the second study, multiple models—coping or mastery—promoted achievement out-comes 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 than mastery models. Benefits of multiple models were not due to perceived similarity in competence, which suggests that similarity may be important when students have few cues to assess efficacy.

In a follow-up study, Schunk and Hanson (1989a) further explored variations in perceived similarity by exposing average-achieving children to one of three types of peer models. *Mastery models* easily grasped arithmetic operations and verbalized positive beliefs (e.g., "I know I can do this one"). *Coping-emotive* models initially experienced difficulties and verbalized negative statements (e.g., "I'm not very good at this"), after which they verbalized coping statements (e.g., "I'll have to work hard on this one") and displayed coping behaviors; eventually they per-formed as well as mastery models. *Coping-alone* models performed in identical fashion to coping-emotive models but never verbalized negative beliefs. Coping-emotive models led to the highest self-efficacy for learning. Mastery and coping-alone subjects perceived themselves as equal in competence to the model; coping-emotive subjects viewed themselves as more competent than the model. The belief that one is more talented than an unsuccessful model can raise efficacy and motivation. Following the instructional program the three conditions did not differ in efficacy or skill, which shows that actual task experience outweighed initial vicarious model effects.

The highest degree of model-observer similarity is attained through *self-modeling*, or behavioral-change that occurs from observing one's own behaviors (Dowrick, 1983). Typically one is viewed while performing a task and subsequently views the tape. Self-model tapes allow for review and are especially informative for tasks one cannot watch while performing, such as a golf swing or tennis serve. When performance errors occur, commentary by a knowledgeable individual during tape review helps to prevent performers from becoming discouraged (Hosford, 1981). The ex-pert can explain how to execute the behavior better the next time. Tapes can convey to observers that they are becoming more skillful and can continue to make progress, which raises self-efficacy.

Schunk and Hanson (1989b) found support for these points during acquisition of arithmetic (fraction) skills. Subjects were children who had been identified by school personnel as working on below-grade-level material. Children received instruction and problem solving practice. Self-modeling subjects were videotaped while successfully solving problems and were shown their tapes, others were videotaped but not shown their tapes until after the study was completed (to control for potential effects of taping), and those in a third condition were not taped (to control for effects of participation). Self-modeling benefits were obtained as these children scored higher on self-efficacy for learning, motivation, and post-test self-efficacy and skill, than did children in the other two conditions. There were no differences between mastery self-model subjects who viewed tapes of

their successful problem solving and progress self-model children whose tapes portrayed their gradual improvement as they acquired skills, which supports the point that the perception of progress or of mastery can build efficacy (Schunk, 1989).

Research in the sport domain has yielded benefits due to model similarity. Gould and Weiss (1981) had college women view a similar model (female student with no athletic background) or dissimilar model (male physical education professor) perform a muscular endurance task. While performing, the model made either positive or negative efficacy statements; irrelevant- and no-statement conditions also were included. Subjects who viewed the similar model performed the task better and judged efficacy higher than students who observed dissimilar models. Regardless of treatment condition, self-efficacy related positively to performance.

These results were replicated by George, Feltz, and Chase (1992) using female college students and models performing a leg-extension endurance task. Students who observed a nonathletic male or female model extended their legs longer and judged self-efficacy higher than those who observed an athletic model, Among these unskilled observers, model ability was a more important similarity cue than model gender.

McCullagh's (1987) study assessed the effects of model similarity on motor performance, College women were exposed to a videotaped peer performing a balance task. Subjects in the similar condition were told that the model was a college student who had no previous experience; dissimilar-condition subjects were informed that the model was a dancer and gymnast who had extensive experience with balance tasks. Similar-model subjects performed the task better than those who observed the dissimilar model. The similar and dissimilar conditions did not differ in self-efficacy and efficacy was not related to actual performance, which may have resulted because subjects' efficacy scores were high and far exceeded their performances.

Results of a study by Lirgg and Feltz (1991) conflict with the earlier evidence on the benefits of peer models compared with adult models (Schunk & Hanson, 1985). Lirgg and Feltz exposed sixth-grade girls to a skilled or unskilled teacher or peer videotaped model demonstrating a ladder-climbing task; control subjects observed no model. Subjects then judged self-efficacy for climbing successively higher levels on the ladder and performed the task over trials. Controls demonstrated poorer performance than those exposed to models; among the latter, children who viewed a skilled model (adult or peer) performed better than those who observed an unskilled model. Skilled-model subjects also judged self-efficacy higher.

It is difficult to resolve the discrepancy with Schunk and Hanson's (1985) results because all of their models were skilled and their task involved learning of cognitive skills. Schunk and Hanson also employed as subjects students who previously had experienced learning difficulties. Peer models may be more effective for such subjects as a means of raising self-efficacy for learning which in turn enhances motivation and skill acquisition. The modeling literature is clear in showing that model competence moderates the effect of exposure to models on observers' behaviors (Bandura, 1986; Schunk, 1987).

In summary, models teach skills and are vicarious sources of self-efficacy information, and perceived similarity to models affects self-efficacy and motivation. The latter effect may be especially pronounced among students who have had difficulty acquiring skills. Also, the belief that one is more competent than a model can raise efficacy. Benefits of multiple models presumably occur because one can identify with at least one of the models and because many peers accomplishing the task implies that it must not be too hard. Self-model tapes convey progress and allow for close observation of behavior, which is especially important when progress is difficult to gauge or one cannot observe one's actions while performing.

Goal Setting

Goal setting is an important variable hypothesized to affect achievement outcomes: self-efficacy, motivation, performance (Bandura, 1988; Locke & Latham, 1990; Schunk, 1990). According to Locke and Latham, goals affect behavior indirectly through their effects on cognitive and motivational mechanisms. For one, goals motivate people to exert effort necessary to meet task demands and to persist at the task over time. The greater

effort and persistence pay off with better performance. For another, goals direct individuals' attention to relevant task features, behaviors to be performed, and potential outcomes, and also can affect how information is processed. Goals can give people "tunnel vision" to focus on the task, select task-appropriate strategies, and decide on the effectiveness of one's approach, all of which are likely to raise performance.

Goal setting also is hypothesized to exert beneficial effects on self-efficacy (Bandura, 1988; Schunk, 1989). Individuals who adopt a goal may experience a sense of self-efficacy for attaining it and engage in activities they believe will produce goal attainment. Self-efficacy is substantiated as persons observe goal progress, which conveys they are becoming skillful (Elliott & Dweck, 1988). Feedback on goal progress also raises self-efficacy, and heightened efficacy sustains motivation and promotes performance (see Figure 1) (Schunk, 1989). Using the framework of action-control theory, Carver and Scheier (1990) show how perceptions of goal progress also can influence affect, with feelings being positive when progress is perceived to occur more rapidly than the specified goal and negative when progress is viewed as occurring at a slower rate than the standard.

The benefits of goals derive largely from the goal properties of proximity, specificity, and difficulty (Bandura, 1986, 1988; Locke & Latham, 1990). Proximal (close-at-hand) goals are postulated to enhance performance better than distant goals, because it is easier to judge progress toward the former than the latter It also is easier to judge progress toward goals incorporating specific performance standards than toward general goals (e.g., "Do your best"). Pursuing easier goals may enhance self-efficacy and motivation during the early stages of skill acquisition, but difficult goals are predicted to be more beneficial as skills develop be-cause they offer more information about capabilities.

These hypothesized benefits of goal setting have been obtained in several studies. Schunk (1983b) provided children with instruction and practice solving long-division problems. During the sessions some children received a specific goal denoting the number of problems to complete; others were given a general goal to work productively. Within each condition, half of the children were given comparative information on the number of problems others completed—which matched the session goal—to convey that goals were attainable. Goals raised self-efficacy and children who received goals and comparative information demonstrated the highest self-efficacy and skill.

Bandura and Schunk (1981) demonstrated the benefits of proximal goals. Children received subtraction instruction with practice opportunities over seven sessions. Children received seven packets of material. Some pursued a proximal goal of completing one packet each session; a second group received a distant goal of completing all packets by the end of the last session; a third group was given a general goal of working productively. Proximal goals led to the highest motivation during the sessions, as well as the highest posttest skill, self-efficacy, and intrinsic interest (based on the number of problems solved during a free-choice period). The distant goal resulted in no benefits compared with the general goal.

Despite this and other evidence showing benefits of proximal goals on self-efficacy, motivation, and performance (Bandura, in press), some research indicates benefits of long-term goals and plans. Kirschenbaum (1985; Kirschenbaum, Humphrey, & Malett, 1981) has shown that distal but moderately specific planning can enhance performance because it encourages persons to assess their progress and maintain flexibility in choosing activities to attain goals. Long-term plans also foster the perception of greater control and choice. In contrast, proximal goals may inhibit performance to the extent participants feel overburdened with the daily planning or discouraged because they do not attain their goals. At the same time, Kirschenbaum (1985) reports that the effectiveness of long-term and nonspecific plans can be enhanced through the use of subgoals. Clearly this issue deserves further study. In some cases distant goals may not be effective due to developmental factors (i.e., young children). The weight of evidence indicates that goal setting requires perceived progress to be effective, and that it is easier to ascertain progress with short-term task or subgoals of larger tasks.

To assess the effects of goal difficulty, Schunk (1983c) gave children a difficult (but attainable) or an easier goal of completing a given number of long-division problems during each instructional session. To prevent

children from believing goals were too difficult, the teacher gave half of the students in each condition attainment information ("You can work 25 problems"); the other half received comparative information indicating that similar peers completed that many. Difficult goals enhanced motivation; children who received difficult goals and attainment information displayed the highest self-efficacy and performance.

Locke, Frederick, Lee, and Bobko (1984) had college students give uses for common objects. Half of the subjects were assigned a difficult goal; others set their own goals. Subsequently all subjects set their own goals. Students assigned difficult goals set higher goals and generated more uses than those initially allowed to set their own goals. When subjects set their own goals, self-efficacy related positively to goal level and commitment.

Allowing individuals to set goals can raise self-efficacy, motivation, and performance, presumably because self-set goals enhance goal commitment. Schunk (1985) gave learning-disabled sixth graders subtraction instruction. Some set daily performance goals, others had comparable goals assigned, and those in a third condition worked without goals. Self-set goals led to the highest judgments of confidence for attaining goals (a type of self-efficacy measure), as well as the highest levels of self-efficacy and skillful performance following instruction, Children in the two goal conditions demonstrated greater motivation during the instructional sessions compared with no-goal subjects.

Working with female field hockey teams, Lee (1988) explored the relations among self-efficacy for accomplishing tasks, individual and group goals, and team winning percentage. Goal factors assessed were; team goals; participation and planning; the coach's support, feedback, and re-wards; conflict and stress; and specific, difficult goals. Team goals and participation and planning were positively related to winning percentage; conflict and stress was negatively related. Self-efficacy correlated positively with winning percentage. Causal analyses showed that both team goals and self-efficacy exerted direct effects on winning percentage. An additional link between self-efficacy and goals was demonstrated by Poag and McAuley (1992), who found that self-efficacy for goal attainment was highly predictive of perceived goal achievement among adult women in conditioning classes.

Against this backdrop of positive *evidence,* the literature also contains studies with conflicting or inconsistent results on the effects of goals, especially in sport and exercise (Weinberg & Weigand, 1993). For example, although specific goals usually boost performance more than general ("Do your best") goals, some research shows no difference. Locke (1991) argues that these inconsistencies arise from methodological short-comings, but Weinberg and Weigand (1993) contend that not all results can arise from methodological problems. The issue is complex, and future research is needed—especially in the sport domain—that examines how the effectiveness of goals and their relation to motivation and self-efficacy are impacted by such potentially important variables as feedback, developmental status, type of task, and setting.

Summary. Goals influence self-efficacy and allow for assessment of progress; the goal properties of proximity, specificity, and difficulty, are important for motivation; commitment is necessary for goals to affect performance; and self-set goals may raise self-efficacy and performance. The latter effect presumably occurs because setting goals helps to foster commitment. The wealth of goal-setting research highlights the diverse ways that goals may affect self-efficacy, motivation, and performance. At the same time, the literature contains conflicting and inconclusive results, which highlights the need for further research.

Feedback

Theory and research support the idea that feedback can affect self-efficacy, motivation, and performance. *Attributional feedback* links behavioral outcomes with one or more *attributions,* or perceived causes of outcomes (Schunk, 1989). Attributional feedback is a persuasive source of self-efficacy information. Assuming that individuals have to work hard to succeed, linking success with effort supports individuals' perceptions of their progress, increases self-efficacy, and sustains motivation. When people succeed with little effort, ability feedback may be seen as more credible.

Several studies support these ideas. Schunk (1982) provided children with subtraction instruction and practice opportunities over sessions. As children solved problems, some received verbal feedback from an adult teacher that linked their prior achievement with effort ("You've been working hard"), whereas others received information on the future value of effort ("You need to work hard"). The feedback for prior attainments led to higher motivation during the sessions and to higher self-efficacy and performance following instruction than did emphasizing the future benefits of effort. In another study (Schunk, 1983a), children periodically received feedback linking their performance with ability ("You're good at this"), with effort ("You've been working hard"), or with ability and effort (combined), as they participated in a subtraction instruction program. Ability feedback enhanced post-instructional self-efficacy and performance better than effort feedback or ability-plus-effort feedback. Although these three conditions raised children's motivation during the instructional program equally well, ability-plus-effort subjects judged effort expenditure greater than ability-only students. Ability-plus-effort subjects may have discounted ability information in favor of effort.

The timing of feedback is important. Ability feedback is credible for success attained easily or early in the course of learning. Effort feedback is more credible when persons have to work hard to succeed. In the context of mathematics instruction and problem solving, Schunk (1984) provided children with ability feedback, effort feedback, ability feedback during the first half of training and effort feedback during the second half, or effort feedback during the first half and ability feedback during the second half. Providing ability feedback for early success, regardless of whether it was continued or children later received effort feedback, led to higher ability attributions and post-instructional self-efficacy and performance, compared with providing effort feedback for early success. Subjects were average achievers and experienced quick success so ability feedback likely seemed credible.

In contrast to these results, Schunk and Rice (1986) found during reading comprehension instruction that later ability feedback exerted better effects on ability attributions and efficacy than did early ability feedback. Subjects were children with severe reading deficiencies and comprehension success was limited early in the instructional program, so ability feedback for early successes may not have been credible. Schunk and Cox (1986) provided learning disabled students with subtraction instruction and practice opportunities and effort feedback during the first or second half of the instructional program or no effort feedback. Either form of effort feedback raised motivation during the instructional program, along with post-instructional self-efficacy and performance, better than no effort feedback; first-half feedback increased effort attributions and motivation during the first half of the program. Given students' learning disabilities, effort feedback for early or later success likely seemed credible because they had to work to succeed.

Taken together, these results suggest a need to consider individuals' capabilities when providing attributional feedback to ensure that the feed-back is credible. When persons succeed easily ability feedback is credible and increases self-efficacy, motivation and performance. When students have to work hard to succeed, they may discount ability feedback in favor of effort. As they become more skillful, switching to ability feedback is desirable because students may believe that their ability is increasing. Under these circumstances, continual effort feedback might even lower self-efficacy if people wonder why they still have to work hard to succeed.

Performance feedback indicating that individuals are performing well or making progress should raise self-efficacy, motivation, and performance, especially when students cannot reliably determine progress on their own. Schunk (1983d) gave children subtraction instruction and practice opportunities over sessions. At the end of each session, self-monitoring children recorded the amount of material completed, external-monitoring subjects had it recorded for them, and no-monitoring subjects did not engage in monitoring, The two monitoring conditions displayed higher self-efficacy and performance following the instructional program com-pared with no monitoring.

Goal progress feedback provides information about progress toward goals. Such feedback is especially valuable when people cannot derive reliable information on their own and should raise self-efficacy, motivation, and performance, to the extent it conveys that individuals are competent and can continue to improve by working

diligently. Higher efficacy sustains motivation when people believe that with continued effort they can attain their goals. Once goals are attained, individuals are likely to adopt new goals (Schunk, 1989).

These ideas have research support. Schunk and Rice (1991) taught remedial readers a strategy to answer comprehension questions. Subjects were given a product goal of answering questions, a process goal of learning to use the strategy, or a process goal plus progress feedback. This feedback, which was a type of strategy attributional feedback because it linked performance with strategy use, conveyed that students were making progress toward their goal of learning to use the strategy to answer questions. Following the training program, goal-plus-feedback students demonstrated higher self-efficacy and performance than did students in the process and product goal conditions, Schunk and Swartz (1993a, 1993b) obtained comparable results in writing achievement with average-achieving and gifted children and also found that self-efficacy and performance generalized over time and across tasks.

Bandura and Cervone (1983) found benefits of feedback in motor skill performance. College students operated an ergometer by alternatively pushing and pulling arm levers that resisted their efforts. Some subjects pursued a goal of increasing performance by 40% over baseline, others were given feedback they had increased performance by 24%, subjects in a third condition received goals and feedback, and controls received neither goals nor feedback. Goals combined with feedback raised performance the best and instated a sense of self-efficacy for goal attainment, which predicted subsequent effort, In follow-up research (Bandura & Cervone, 1986), subjects received a goal of 50% improvement above base-line. Following their performance, subjects received false feedback indicating they achieved an increase of 24%, 36%, 46%, or 54%. Self-efficacy was lowest for the 24% group and highest for the 54% condition. After subjects set goals for the next session and performed the task again, effort expenditure related positively to goals and self-efficacy across all conditions.

To summarize, feedback is a persuasive source of self-efficacy information. Attributional feedback linking performance to effort and ability is beneficial for self-efficacy, motivation, and performance. Goal progress feedback is especially valuable when individuals cannot determine progress on their own. The credibility of feedback is imperative if it is to affect outcomes. Effort feedback is credible when participants have to work to succeed. Other types of feedback—such as ability or effective strategy use—are credible as skills develop and success requires less effort.

Predictive Utility of Self-efficacy

In this section I present evidence on the utility of self-efficacy as a predictor of behavior. This evidence falls into two categories: studies that relate self-efficacy to subsequent performance measures using correlation and regression procedures, and studies that provide direct tests of causal models using a procedure such as path analysis. In general, the literature supports the hypothesized utility of self-efficacy as a predictor of action (Bandura, 1986, in press).

Discussions of the type in this section raise many complex questions. For example, several investigators purport to assess the role of self-efficacy as a variable that mediates the relation between an antecedent factor (e.g., training) and a subsequent outcome (achievement). Baron and Kenny (1986) distinguish between moderator and mediator variables. A *moderator* is an independent variable that is causally antecedent or exogenous to a criterion variable and affects the strength or relation between one or more other independent variables and the criterion variable. A *mediator is* a variable that helps to account for the relation between a predictor and criterion variable by internally transforming the effect of the predictor variable from an external to an internal (psychological) significance. Moderators specify when certain effects hold; mediators help to explain those effects.

Given this distinction it is not clear that all studies claiming to test the mediational role of self-efficacy have actually done so. It is not my purpose to critically evaluate the methodologies or adequacy of statistical procedures of the studies summarized; to do so would extend beyond the scope of this article. Rather, I caution

readers that, when reviewing the literature, to examine methodological and statistical procedures carefully to determine their adequacy and the validity of conclusions.

Correlation and Regression Analyses

Research examining the relation of self-efficacy to achievement out-comes has obtained significant and positive correlations (range of rs = .38—.42) between self-efficacy for learning cognitive skills (assessed prior to instruction) and subsequent task motivation (Schunk & Hanson, 1985; Schunk et al., 1987). Self-efficacy for learning also correlates positively with self-efficacy and skill assessed after instruction (range of rs = .46— .90) (Schunk, 1989). Significant and positive correlations have consistently been found between measures of self-efficacy and performance assessed after instruction (range of rs = .27—.84) (Schunk, 1989).

Multiple regression has determined the percentage of variability in performance accounted for by self-efficacy. Schunk (1982) showed that motivation and self-efficacy account for significant increments in variability in subsequent skillful performance. Schunk and Swartz (1993a) found that self-efficacy was an accurate predictor of children's writing achievement; McCarthy, Meier, and Rinderer (1985) obtained the same result among college students. Shell, Murphy, and Bruning (1989) demonstrated the predictive utility of self-efficacy across the domains of reading and writing among college students.

Collins (1982) showed that self-efficacy predicts motivation and achievement across ability levels. Children identified as high, average, or low in mathematical ability, were classified as high or low in self-efficacy for solving word problems. Students were given problems (some were insolvable) and could rework any they missed. Low- and average-ability students with high self-efficacy worked problems longer than low self-efficacy students. Regardless of ability, students with higher self-efficacy reworked more problems than students with lower efficacy.

There is much evidence that self-efficacy predicts athletic performance among adults and children (Wurtele, 1986). Positive and significant correlations between self-efficacy and subsequent performance measures have been obtained in the areas of diving (*r* = .29, Feltz, Landers, & Raeder, 1979); muscular leg endurance (*r* = .68, Weinberg, Gould, & Jackson, 1979); leg lifting (*r* = .31, Gould & Weiss, 1981); tennis (*r* = .53, Barling & Abel, 1983); and gymnastics (*r* .55, Lee, 1982; range of rs = .28—.71, McAuley & Gill, 1983; range of rs = .27—.84, Weiss, Wiese, & Klint, 1989).

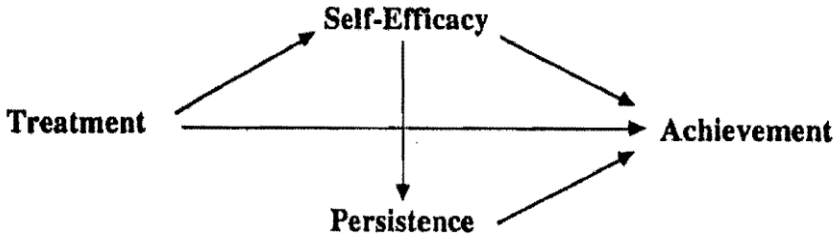

Figure 2. Causal model testing predictions of self-efficacy theory.

Causal Models

Studies testing causal models have demonstrated an important role for self-efficacy (Schunk, 1989; Wurtele, 1986). In the Schunk (1981) study, path analysis was used to reproduce the correlation matrix comprising modeling treatment and post-treatment outcomes (self-efficacy, persistence, achievement). As shown in Figure 2, the most parsimonious model showed a direct effect of treatment on achievement and an indirect effect through self-efficacy and persistence, an indirect effect of treatment on persistence through self-efficacy, and direct effects of self-efficacy on achievement and persistence. Relich et al. (1986) found that self-efficacy exerted a direct effect on achievement and that instructional treatment had a direct effects on achievement and an indirect one through self-efficacy. Schunk and Gunn (1986) used path analysis to examine the effects on changes in children's mathematical achievement due to strategy use, attributions, and self-efficacy. The strongest influence on self-efficacy was due to ability attributions for success.

In the Locke et al. (1984) study, self-efficacy for attaining moderate to difficult goals predicted students' performances. Path analysis supported the ideas that self-efficacy affects goal choice and that achievement is influenced by self-efficacy, goals, prior performance, and strategies used.

Feltz (1982) employed path analysis to determine the influences on women's back-diving performance. Prior performance and self-efficacy predicted subsequent performance. Self-efficacy was important in the early trials, but as subjects gained experience prior performance became the better predictor of achievement. Feltz and Mugno (1983) found that self-efficacy was a strong predictor of early performance but with experience diving performance became the major predictor of the next dive. Garland, Weinberg, Bruya, and Jackson (1988) demonstrated that subjects' goals for exercise influence 'self-efficacy, which in turn affects performance. McAuley (1991) obtained evidence that participation in exercise by middle-aged adults influences exercise self-efficacy, which in turn exerts positive effects on perceived personal control and affect.

Future Directions

The preceding research makes it clear that self-efficacy plays an important role in human motivation and performance in many situations. At the same time, there are areas that need to be addressed. In this section I suggest some directions for future research.

Goal Orientations

An important area is to examine relations among self-efficacy, types of goals, motivation, and achievement (Duda, 1993). People have goal dispositions or orientations that reflect their beliefs about the factors that influence success. Of particular interest are task and ego orientations. A *task orientation* refers to the goal of learning or improving one's skills (Nicholls, 1983). Task-oriented individuals roughly equate learning with skill, stress the value of effort, and believe that through diligent effort they can improve their skills. They are likely to compare their present with their past performance to determine progress. An *ego orientation* refers to the goal of performing better than others and looking competent. Ego-oriented persons feel that learning is important as a means of looking competent, they emphasize the value of ability, and they believe that effort can raise performance only to the level set by ability. They are apt to socially compare their performances with those of others to determine where they stand.

Initial research supports the point that self-efficacy relates to goals and achievement outcomes. Meece, Blumenfeld, and Hoyle (1988) showed that students with task-mastery goals report more active cognitive engagement with material to be learned and that perceived competence relates positively to motivation and task-mastery goals. Schunk and Swartz (1993b) found that providing children with a process goal of learning to use a strategy and feedback on their progress increases task orientation and decreases ego orientation, and that self-efficacy correlates positively with task orientation and negatively with ego orientation.

Wood and Bandura (1989) had adults engage in a managerial decision-making task and told them that decision-making ability was fixed (reflected their basic cognitive capabilities) or incremental (developed through practice). These ability conceptions often are associated with ego and task orientations, respectively (Dweck & Leggett, 1988; Nicholls, 1983). Incremental subjects maintained high self-efficacy, set challenging goals, applied rules efficiently, and performed better; entity subjects showed a decline in self-efficacy. Comparable results were obtained by Jourden, Bandura, and Banfield (1991) among college students performing a pursuit-rotor tracking task. Subjects led to believe that performance was an acquirable skill showed increased self-efficacy, positive self-reactions to their performance, greater skill acquisition and task interest; those led to believe that performance reflected inherent aptitude showed no gain in self-efficacy, little increase in skill and interest, and negative self-reactions.

Elliott and Dweck (1988) showed that children given a learning goal choose challenging tasks and persist in applying effective strategies, regardless of whether they view their ability as high or low. Children given a performance goal (displaying competence) who perceive ability as high use effective task strategies; those who perceive ability as low are less likely to use strategies.

Duda and Nicholls (1992) found for both sport and schoolwork that task orientation relates to high school students' beliefs that success depends on effort and collaboration with peers, whereas ego orientation is associated with beliefs that success is due to high ability and attempting to perform better than others. Goal orientations and beliefs about success were not strongly related to perceived ability. Perceived ability related more to satisfaction in sport than in school; the opposite pattern was obtained for task orientation. Lochbaum and Roberts (1993) found that athletes with a task orientation focus on adaptive (problem-solving) strategies, whereas ego-oriented athletes are more likely to use less-effective strategies.

Chi (1993) conducted a study that compared predictions of self-efficacy theory with those of goal theory. According to Bandura (1986), a low sense of self-efficacy should be associated with negative achievement behaviors (e.g., low effort and persistence); however, as noted above several investigators (e.g., Elliott & Dweck, 1988; Wood & Bandura, 1989) have found differences in achievement behaviors depending on subjects' goals and task perceptions. Working with male college students on a physical exertion task, Chi found that high task-oriented subjects report greater perceived fitness competence (i.e,, self-efficacy) regardless of how well they perform, whereas high ego-oriented subjects report lower perceived competence after being told they performed poorly. 'The former subjects are better able to maintain a sense of efficacy even when they receive information indicating poor performance. These results suggest that goal orientations and self-efficacy perceptions combine in ways not originally predicted by self-efficacy theory.

The preceding research offers a promising start but more work is need-ed. An important framework that may help to address these issues is the resource allocation model (Kanfer & Ackerman, 1989; Kanfer & Kanfer, 1991), This integrated model posits that attention resources are the key processes through which abilities, motivation, self-regulation, and perceived task demands, affect performance. Attentional effort is a limited resource and is allocated to activities as a function of motivation and self-regulatory processes. Distal processes refer to task-related goals and place a limit on total resource availability. Proximal processes direct attention to on-task, off-task, or self-regulatory activities. Allocations are adjusted based on feedback on effectiveness. When task demands are great (e.g., difficult goals) people allocate greater attention to the task; when demands are lower they may shift some attention to other activities and away from the task. Self-regulation is a key mechanism for producing changes in resource allocation. Kanfer and Ackerman found that task-specific confidence in capabilities (i.e., self-efficacy) is associated with higher levels of self-regulatory activity and thus affects resource allocation. As Wood and Bandura (1989) and Jourden et al.,(1991) have shown, self-efficacy bears an important relation to conception of ability; thus, the latter construct may indirectly affect allocation of attentional resources.

Future research might investigate these links further; in particular, whether changes in performance brought about by modifying students' goal orientations are mediated by self-efficacy and how that relates to attentions' control. Positive results would suggest that training programs designer' to enhance skills also need to be gauged for their effects on goal orientations and self-efficacy.

Maintenance and Generalization

Research is needed on maintenance and generalization of self-efficacy, motivation, and performance. Studies typically examine maintenance over brief periods and generalization across small variations in settings and content. Graham and Harris (1989a, 1989b) and Schunk and Swartz (1993a, 1993b) found that changes in self-efficacy, strategy use, and achievement, brought about by educational interventions maintained themselves for up to 12 weeks and generalized to other tasks, but these studies did not determine the extent that self-efficacy contributed to maintenance and generalization.

There is a question about the generality of self-efficacy. Self-efficacy is usually conceptualized as being domain specific, especially for the purpose of predicting behavior (Bandura, 1986; Schunk, 1989). Most studies have not investigated whether self-efficacy generalizes beyond specific domains, but there is evidence for a generalized sense of self-efficacy. Duda and Nicholls (1992) found a moderate positive correlation between

ability perceptions for sport and schoolwork. Studies in the sport domain by Brody, Hatfield, and Spalding (1988) and by Holloway, Beuter, and Duda (1988) also report generalization of self-efficacy.

Further research is needed. Aptitudes, prior experiences, and social supports, affect students' initial self-efficacy for learning or performing. Athletically-able students who generally perform well and who receive encouragement to develop their skills from friends and families should have higher self-efficacy for learning a new skill than students with lower ability who receive little assistance from others and who have had prior difficulties learning. Self-efficacy might generalize to the extent that the new domain builds on prior skills or that the domains share skills. Thus, students who believe that science and basketball involve goal setting, use of effective strategies, and hard work, and who feel efficacious about per-forming these tasks in basketball may have high efficacy for accomplishing their first science fair project.

Instructional Efficacy

More investigations are required on the role of self-efficacy among teachers and coaches. *Teaching efficacy* refers to personal beliefs about capabilities to help students learn, and it should influence teachers' activities, effort, and persistence (Ashton & Webb, 1986). Teachers with low efficacy may avoid planning activities they believe exceed their capabilities, not persist with students having difficulties, expend little effort to find materials, and not reteach in ways students might understand better. Teachers with higher efficacy might develop challenging activities, help students succeed, and persevere with students who have problems. These motivational effects enhance student achievement, as well as teachers' self-efficacy by conveying they can help students learn, Ashton and Webb found that teachers with higher self-efficacy were likely to have a positive classroom environment, support students' ideas, and address students' needs. Teacher self-efficacy was a significant predictor of student achievement. Woolfolk and Hoy (1990) found comparable results among prospective teachers.

Research is needed in which variations in teachers' and coaches' self-efficacy brought about by interventions are systematically related to changes in teacher behaviors and student performance, Research also should explore the notion that teacher efficacy and teacher-student interactions are reciprocally related. When working with students, teachers with high efficacy are apt to convey that students are capable of learning and act in ways they believe will assist student learning: explain and model new behaviors to be acquired, check student performance, provide corrective feedback. 'These behaviors should raise students' self-efficacy and motivation. How students react to teachers will influence teachers' efficacy. Students who respond enthusiastically may enhance teachers' efficacy and motivation. When students have undue difficulty or seem unenthusiastic, teachers may question their competence and wonder whether additional effort will produce better results.

Efficacy Assessment

Finally, we need more research on ways to assess self-efficacy and its relation to achievement outcomes. The proliferation of efficacy research in recent years adds to our understanding but also results in a multitude of measures that often seem conceptually unrelated, Researchers need to show how their measure taps self-efficacy and not such other related constructs as attributions, locus of control, interest, or satisfaction. I noted earlier that self-efficacy often is equated with outcome expectancy in the literature. The two constructs typically are related but must be kept distinct since a student may expect positive outcomes (e,g., high grade) for a stellar performance but may doubt his or her capabilities to perform at that level. Investigators also should report reliability data and include instruments in articles (Pintrich & De Groot, 1990).

Researchers typically have conducted short-term correlational or experimental studies. 'There is a need for longitudinal studies and alternative forms of data collection (e.g., case studies, oral histories), Although such studies might include fewer subjects, they would yield rich data.

Much research has related self-efficacy to such measures as students' self-reports of intentions to engage in various activities. This type of research has advantages and typically yields valid data (Assor & Connell, 1992),

but it does not take into account the intricacies of teaching and learning. There is a need for research with teachers and coaches as they teach skills.

We need more research examining how motivation and performance relate to self-efficacy. Bandura (1986) postulates that self-efficacy influences choice of activities, effort, and persistence. These effects are seen most clearly when behavior reflects performance of previously learned skills. In learning settings, the influence of self-efficacy on these indexes is complex. Choice may not be a good index because students usually do not choose to participate in learning activities. Choice is meaningful only when individuals have options.

There also are problems with persistence. Bandura (1986) predicted that persistence will increase as self-efficacy develops. This prediction was supported in early clinical research; for example, phobic persons judge self-efficacy low and do not persist at threatening activities but their persistence increases as they participate in feared situations and gain confidence. In learning situations, however, students persist in part because teachers and coaches keep them working. Self-efficacy is a poor predictor of persistence when students do not have the choice to work on a task. As skills develop, higher self-efficacy may relate negatively, rather than positively, to persistence, because students with higher self-efficacy are likely to be skillful and may not have to persist very long to perform well.

Better indexes of motivation may be effort and use of effective strategies. Cognitive effort may need to be assessed with a self-report instrument, but much evidence shows that self-reports of personal experiences and beliefs generally are reliable and valid predictors of performance (Assor & Connell, 1992). Students with high self-efficacy are likely to be motivated to engage in activities they believe will assist them, such as paying attention, concentrating on models, organizing and rehearsing in-formation to be remembered, practicing behaviors and monitoring performance, and relating new to prior learning.

Implications for Education and Training

Some potential implications of the theory and research results for education and training are as follows. First, *assess how procedures affect self-efficacy and motivation.* There is much emphasis in schooling and sport on assessing how training affects learning and performance. This focus is important but insufficient, because practices good for training may not be beneficial for self-efficacy and motivation. In designing training procedures we need to ask how they might affect a broad range of outcomes including performance, motivation, and self-efficacy.

For example, providing students with instruction that includes extensive assistance from teachers or coaches should facilitate skill acquisition; however, this procedure may not raise self-efficacy much. Students may attribute their success largely to the assistance. To raise efficacy trainers must include periods of self-directed mastery or independent practice where learners practice skills on their own.

Second, *employ peers as models.* Model competence is critical and adult teachers and coaches make excellent models for teaching students skills and raising their self-efficacy. A problem arises with students who have encountered prior difficulties. These situations are common in school (e.g., students with learning problems) and sport (e.g., individuals who have difficulty coordinating movements), Such students may not relate to the masterful performances displayed by competent adults. Their self-efficacy may be better enhanced by peer models and especially peers whom they view as similar to themselves in underlying abilities. Multiple models may help ensure that students perceive themselves as similar to at least one of the models and convey that the task can be accomplished. Among unskilled students and those who previously have experienced difficulties, similarity can be enhanced by having peers demonstrate coping skills: concentrating on what the teacher is saying, persisting, expending effort, changing to a better strategy.

A third point is to *use goals and foster commitment.* Goals, by themselves, are less important than their properties and how individuals use goals to guide behavior and assess progress. Although such long-range goals as earning a college degree or winning a championship can mobilize efforts, for goals to affect performance

they should be broken into manageable subtasks that are clearly specified and viewed as challenging but attainable. People are not motivated to attempt the impossible; they are apt to feel much more capable of attaining subgoals. Learners must make a commitment to attempt to attain goals.

Goal properties allow persons to compare their present performance with their goal to determine progress. It is difficult to assess progress toward ill-stated or general goals because almost any performance seems adequate. People who perceive they are making progress are likely to feel efficacious about continuing to improve and motivated to do so, Lack of perceived progress will not necessarily lower efficacy and motivation if learners believe that with additional effort or use of better strategies they can improve performance.

Finally, *provide specific and credible feedback.* Specific feedback that denotes how performance has improved is likely to raise self-efficacy and motivation. Simply telling students "good work" is not apt to have much effect unless students understand which aspects of performance are good. Feedback also will not be beneficial for self-efficacy and motivation if learners do not view it as credible.

Attributional feedback must be linked to outcomes and match students' perceptions to enhance efficacy and motivation. Telling students they are getting good at a task is apt to ring hollow if they are struggling to succeed. Telling them they are working hard may raise efficacy if they are expending effort, but could lower it if they think they are not working as hard as previously and wonder why the teacher thought they were. Educators must consider how feedback is likely to be interpreted by students prior to delivering it.

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