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Self-Efficacy Beliefs in Academic Settings

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The purpose of this article is to examine the contribution made by the self-efficacy component of Bandura's (1986) social cognitive theory to the study of self-regulation and motivation in academic settings. The difference between self-efficacy beliefs and other expectancy constructs is first explained, followed by a brief overview of problems in self-efficacy research. Findings on the relationship between self-efficacy, motivation constructs, and academic performances are then summarized. These findings demonstrate that particularized measures of self-efficacy that correspond to the criterial tasks with which they are compared surpass global measures in the explanation and prediction of related outcomes. The conceptual difference between the definition and use of expectancy beliefs in social cognitive theory and in expectancy value and self-concept theory is then clarified. Last, strategies to guide future research are offered.

In *Social Foundations of Thought and Action,* Albert Bandura (1986) wrote that individuals possess a self system that enables them to exercise a measure of control over their thoughts, feelings, and actions. This self system houses one's cognitive and affective structures and includes the abilities to symbolize, learn from others, plan alternative strategies, regulate one's own behavior, and engage in self-reflection. It also plays a prominent role in providing reference mechanisms and a set of subfunctions for perceiving, regulating, and evaluating behavior, which results from the interplay between the self system and external-environmental sources of influence. As such, the self system serves a self-regulatory function by providing individuals with the capability to alter their environments and influence their own actions. In all, Bandura painted a portrait of human behavior and motivation in which the beliefs that people have about themselves are key elements in the exercise of control and personal agency.

According to Bandura's (1986) social cognitive theory, self-referent thought mediates between knowledge and action, and through self-reflection individuals evaluate their own experiences and thought processes. Knowledge, skill, and prior attainments are often poor predictors of subsequent attainments because the beliefs that individuals hold about their abilities and about the outcome of their efforts powerfully influence the ways in which they will behave. This view is consistent with that of theorists who have argued that the potent nature of beliefs

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makes them a filter through which new phenomena are interpreted and subsequent behavior mediated (Abelson, 1979; Dewey, 1933; James, 1885/1975; Mead, 1982; Nisbett & Ross, 1980; Pajares, 1992; Posner, Strike, Hewson, & Gertzog, 1982; Rokeach, 1960, 1968).

How individuals interpret the results of their performance attainments informs and alters their environments and their self-beliefs, which in turn inform and alter their subsequent performances. This is the foundation of Bandura's (1978b, 1986) conception of *reciprocal determinism,* the view that (a) personal factors in the form of cognition, affect, and biological events, (b) behavior, and (c) environmental influences create interactions that result in a *triadic reciprocality* (see Figure 1). Because personal agency is socially rooted and operates within sociocultural influences, individuals are viewed both as products and as producers of their own environments and of their social systems.

Bandura (1986) considered self-reflection the most uniquely human capability, for through this form of self-referent thought people evaluate and alter their own thinking and behavior. These self-evaluations include perceptions of *self-efficacy*, that is, "beliefs in one's capabilities to organize and execute the courses of action required to manage prospective situations" (Bandura, in press, p. 2). These beliefs of personal competence affect behavior in several ways. They influence the choices individuals make and the courses of action they pursue. People engage in tasks in which they feel competent and confident and avoid those in which they do not. If James (1892/1985) was correct that experience is essentially what individuals choose to attend to, then self-beliefs that influence those choices are instrumental in defining one's experience and providing an avenue through which individuals exercise control over the events that affect their lives. Efficacy beliefs help determine how much effort people will expend on an activity, how long they will persevere when confronting obstacles, and how resilient they will prove in the face of adverse situations—the higher the sense of efficacy, the greater the effort, persistence, and resilience. Efficacy beliefs also influence individuals' thought patterns and emotional reactions. People with low self-efficacy may believe that things are tougher than they really are, a belief that fosters stress, depression, and

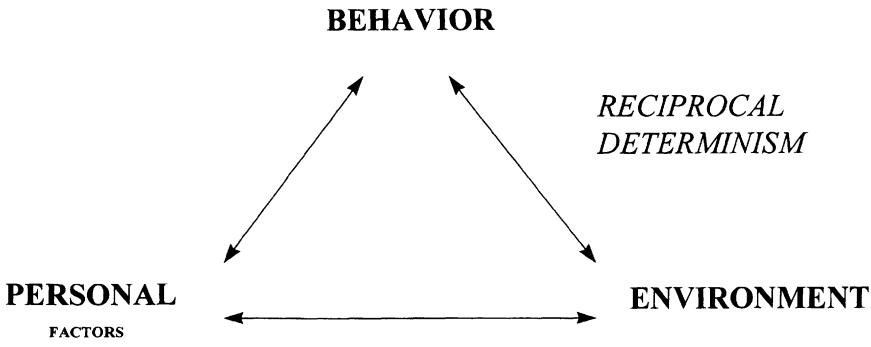

FIGURE 1. *Model of the relations between the three classes of determinants in Bandura's (1986) conception of triadic reciprocality*

a narrow vision of how best to solve a problem. High self-efficacy, on the other hand, helps to create feelings of serenity in approaching difficult tasks and activities. As a result of these influences, self-efficacy beliefs are strong determinants and predictors of the level of accomplishment that individuals finally attain. For these reasons, Bandura (in press) argued that "beliefs of personal efficacy constitute the key factor of human agency" (p. 3).

The construct of self-efficacy has a relatively brief history that began with Bandura's (1977) publication of "Self-Efficacy: Toward a Unifying Theory of Behavioral Change." The tenets of self-efficacy have since been tested in varied disciplines and settings and have received support from a growing body of findings from diverse fields (see Bandura, in press; Maddux & Stanley, 1986; Multon, Brown, & Lent, 1991). For example, self-efficacy has been the focus of studies on clinical problems such as phobias (Bandura, 1983), depression (Davis & Yates, 1982), social skills (Moe & Zeiss, 1982), and assertiveness (Lee, 1983, 1984); on smoking behavior (M. E. Garcia, Schmitz, & Doerfler, 1990); on pain control (Manning & Wright, 1983); on health (O'Leary, 1985); and on athletic performance (Barling & Abel, 1983; Lee, 1982). During the past decade, self-efficacy beliefs have received increasing attention in educational research, primarily in the area of academic motivation (Pintrich & Schunk, 1995).

The role that self-beliefs play in motivating individuals is the primary focus of theoretical perspectives other than those of social cognitive theory. These include theories about self-concept, attributions of success and failure, expectancy value, goals, and self-schemas and possible selves. Self-beliefs specific to one's perceived competence, or *expectancy beliefs,* are also prominent in the area of academic motivation. To better understand the role that self-beliefs play in academic settings, researchers have investigated the relationships between these beliefs and various academic performances, as well as the relationships among the beliefs themselves. Results generally support the contentions of social cognitive theory as regards the role of self-efficacy (see Multon et al., 1991), but they have not been successful in clarifying the nature of the relationship between self-efficacy beliefs and other expectancy constructs, nor have they been successful in sifting out and demonstrating either the practical or the empirical difference between them. Moreover, because beliefs about one's perceived capability are subsumed into the conceptual and operational definitions of most motivation constructs, results often produce confounded relationships and ambiguous findings that obfuscate the potential contribution of any expectancy belief to the understanding of academic motivation.

The purpose of this article is to examine the contribution made by the self-efficacy component of Bandura's (1986) social cognitive theory to the study of self-regulatory strategies, motivation, and achievement in academic settings. To those ends, the difference between self-efficacy beliefs and other expectancy constructs is first explained, followed by a brief overview of problems that affect research in this area. Key findings on the role of self-efficacy in academic settings are then summarized. To illustrate the conceptual difference between the definition and use of perceptions of competence in social cognitive theory and in other theoretical perspectives of motivation, the ways such self-perceptions are used in two theoretical arenas outside Bandura's social cognitive perspective are then examined—those of expectancy value and of self-concept. Lastly, strategies that

may help to clear the conceptual waters and guide future research in this area are suggested.

Self-Efficacy and Other Expectancy Beliefs

It is an acknowledgment of the presumed influence of individuals' self-perceptions of competence on motivation and on behavior that these judgments form the core component of various expectancy theories and are a key component of most other motivation theories. Self-efficacy and other expectancy beliefs have in common that they are beliefs about one's perceived capability; they differ in that self-efficacy is defined in terms of individuals' perceived capabilities to attain designated types of performances and achieve specific results. According to social cognitive theory, the events over which personal influence is exercised vary. Depending on what is being managed, it may entail regulation of one's own motivation, thought processes, affective states and actions, or changing environmental conditions. Self-efficacy beliefs are sensitive to these contextual factors. As such, they differ from other expectancy beliefs in that self-efficacy judgments are both more task- and situation-specific and in that individuals make use of these judgments in reference to some type of goal (Bandura, 1986, 1989; Pintrich & Schunk, 1995). Consequently, self-efficacy is generally assessed at a more microanalytic level than are other expectancy constructs, which, although they may be domain specific, are more global and general self-perceptions.

Researchers assess self-efficacy beliefs by asking individuals to report the level, generality, and strength of their confidence to accomplish a task or succeed in a certain situation (see Table 1). In academic settings, self-efficacy instruments may ask students to rate their confidence to solve specific mathematics problems (Hackett & Betz, 1989), perform particular reading or writing tasks (Shell, Colvin, & Bruning, 1995), or engage in certain self-regulatory strategies (Bandura, 1989). Assessments of other expectancy beliefs include asking students to report how well they expect to do in an academic subject (i.e., performance expectancies, Meece, Wigfield, & Eccles, 1990), whether they understand what they read (i.e., perceptions of competence, Harter, 1982), and whether they are good in an academic subject (i.e., academic domain-specific self-concept, Marsh, 1992; also ability perceptions, Meece et al., 1990).

In one sense, the issue centers around which types of questions, and the beliefs such questions tap, afford greater prediction and explanation of an individual's dispositions, behavioral intentions, and subsequent actions. Conversely, this is an issue of which types of questions individuals primarily ask themselves as they encounter new information and novel phenomena, engage in tasks, and sort out just what it is that they will or will not do.

Problems in Research on Perceived Competence

As noted earlier, research findings have generally supported the contentions of social cognitive theory as regards the role of self-efficacy. Findings have also been successful in supporting the contentions of other expectancy theories. It is, of course, in keeping with the predictive nature of normal science that most theoretical contentions receive support when only significant results tend to make the transition from analysis to publication (Kuhn, 1970). Findings have not been as successful in clarifying the nature of the relationship between self-efficacy and

other expectancy beliefs, nor have they been successful in sifting out and demonstrating their differences. There are two key reasons for this lack of success.

Specificity and Correspondence

In many cases, the problem is one of mismeasurement of self-efficacy, a problem that has plagued research in this area (see Zimmerman, 1996). In part, the problem is this: Because judgments of self-efficacy are task and domain specific, global or inappropriately defined self-efficacy assessments weaken effects. Consequently, Bandura (1986) has cautioned researchers attempting to predict academic outcomes from students' self-efficacy beliefs that, to increase accuracy of prediction, they would be well advised to follow theoretical guidelines regarding *specificity* of self-efficacy assessment and *correspondence* with criterial tasks. That is, self-efficacy beliefs should be assessed at the optimal level of specificity that corresponds to the criterial task being assessed and the domain of functioning being analyzed. This caution has often gone unheeded in educational research, which has resulted in self-efficacy assessments that reflect global or generalized attitudes about capabilities bearing slight or no resemblance to the criterial task with which they are compared. Often, no criterial task is identified, as researchers aim to discover simply the nature of the interplay among motivation variables in the absence of performance attainments. In still other studies, judgments of "confidence" that bear passing resemblance to self-efficacy beliefs are used instead of more appropriate particularized measures.

The broadest, most general self-efficacy assessments consist of an omnibus-type instrument that attempts to measure a general sense of efficacy or "confidence." Bandura (1986, in press) argued that such omnibus measures create problems of predictive relevance and are obscure about just what is being assessed. Omnibus tests that aim to assess general self-efficacy provide global scores that decontextualize the self-efficacy–behavior correspondence and transform self-efficacy beliefs into a generalized personality trait rather than the context-specific judgments Bandura suggests they are. Generalized self-efficacy instruments assess people's general confidence that they can succeed at tasks and in situations without specifying what these tasks or situations are. Even domain-specific omnibus measures are problematic if composite multiscale scores drawn from differing subsections of the domain are used. It is not altogether easy to see what value composite scores provided by multiple-scale instruments may have if one wishes to predict relatively discrete academic outcomes (see Pajares & Miller, 1995b).

Various researchers have assessed general academic self-perceptions of competence (see the meta-analysis of Multon et al., 1991). The problem with such assessments is that students must generate judgments about their academic capabilities without a clear activity or task in mind. As a result, they generate the judgments by in some fashion mentally aggregating related perceptions that they hope will be related to imagined tasks. Domain-specific assessments, such as asking students to report their confidence to learn mathematics or writing, are more explanatory and predictive than omnibus measures and preferable to general academic judgments, but they are inferior to task-specific judgments because the subdomains differ markedly in the skills required.

Academic domain-specific assessments of self-efficacy are especially common

TABLE 1
Items used to measure various self-efficacy constructs

Source	Sample question or direction	Answer options
Teaching efficacy (Bandura, 1993)	How much can you . . . ? [completed by various teaching-related tasks—e.g., "influence the decisions that are made in your school"]	1 (*nothing*) to 9 (*a great deal*), in intervals of 1
Mathematics problem-solving self-efficacy (Pajares & Miller, 1994)	How confident are you that you could give the correct answer to the following problem without using a calculator? [followed by 20 algebra or geometry problems—e.g., "Simplify: $-6[x + (-7y)] + (-5)(3x - y)$"]	1 (*no confidence*) to 6 (*complete confidence*), in intervals of 1
Self-efficacy for self-regulated learning (Bandura, 1989)	How well can you . . . ? [completed by 11 self-regulatory tasks—e.g., "finish homework assignment by deadlines"]	1 (*not well at all*) to 7 (*very well*), in intervals of 1
Self-efficacy for writing skills (Shell et al., 1989)	How confident are you that you can perform each of the following writing skills? [8 skills presented—e.g., "correctly spell all words in a one-page passage"]	Scale of 0 to 100—student writes the specific number
Mathematics courses self-efficacy (Betz & Hackett, 1983)	How much confidence do you have that you could complete the following course with a final grade of B or better? [courses presented—e.g., "algebra"]	0 (*no confidence*) to 9 (*complete confidence*), in intervals of 1
Collective efficacy (Bandura, 1993)	Please indicate your confidence that you can attain the following grade level gains with the students in your class this year. [gains in 2-month increments presented]	0 (*no confidence at all*) to 10 (*certain I can do*), in intervals of 1

TABLE 1
Continued

Source	Sample question or direction	Answer options
Self-efficacy for performance of division problems (Schunk, 1981)	[Division problem shown for 2 seconds] Circle the number on the line that matches how sure you are that you could work problems like those shown and get the right answers.	10 (*not sure*) to 100 (*really sure*), in intervals of 10
Self-efficacy for reading tasks (Shell et al., 1995)	How confident are you that you can perform each of the following reading tasks? [18 tasks presented—e.g., "read a letter from a friend"]	1 (*I'm sure I can*) to 5 (*I'm sure I can't*), in intervals of 1
Self-efficacy for academic achievement (Bandura, 1989)	How well can you . . . ? [completed by 9 academic domains—e.g., "learn general mathematics, learn reading and writing language skills"]	0 (*not well at all*) to 7 (*very well*), in intervals of 1
Self-efficacy for learning (Schunk, 1996)	[Students are presented with sample mathematics problems or reading/writing tasks for a brief time. They are asked to provide a confidence judgment to correctly solve the problems, perform paragraph writing tasks, etc.]	10 (*not sure*) to 100 (*really sure*), in intervals of 10

in educational research, in part because the criterial outcome tasks such as semester grades or achievement test results that are often used do not lend themselves to particularized self-efficacy assessment. The typical strategy of researchers in this regard is to use multiple items to restate different facets (or even similar facets differently phrased) of the same academic subject. It is not unusual for a mathematics self-efficacy scale to be populated with items such as "I am confident about my ability to do the work in this class," "I am certain I can understand the math presented in this class," and "I am confident I can perform as well or better than others in this class." Although high internal consistency can be counted on, such assessments primarily provide a redundant measure of the general domain.

Bandura (1982, 1986) argued that reasonably precise judgments of capability matched to a specific outcome afford the greatest prediction and offer the best explanations of behavioral outcomes, because these are typically the sorts of judgments that individuals use when confronted with behavioral tasks. To this end, if the purpose of a study is to achieve explanatory and predictive power, self-efficacy judgments should be consistent with and tailored to the domain of functioning and/or task under investigation. This is especially critical in studies that attempt to establish causal relations between beliefs and outcomes. All this is to say that capabilities assessed and capabilities tested should be similar. Some researchers have operationalized mathematics self-efficacy as a composite score of a multiscale instrument that comprises judgments of confidence to succeed in mathematics courses as diverse as geometry and accounting, complete math-related tasks as disparate as filling out an income tax form and figuring out how much material to buy so as to make curtains, and solve algebra and geometry problems of varying difficulty. Others have operationalized writing self-efficacy as the combined score of one subscale assessing a student's confidence to accomplish writing tasks of varying difficulty and another subscale assessing confidence to perform differing composition skills. Teacher efficacy instruments typically ask teachers to express confidence judgments on matters as disparate as classroom management and the influence of family background on student learning and then compare the composite score of these judgments with outcomes such as student achievement indexes or varied teaching practices. Because such self-efficacy assessments lack the specificity of measurement and consistency with the criterial task that optimize the predictive power of self-efficacy beliefs, results minimize the influence of self-efficacy (see Bandura, 1986, in press; Pajares, 1996a; Pajares & Miller, 1995b; Zimmerman, 1996).

A Proliferation of Expectancy Constructs

Another reason for the lack of clarity regarding the relationship between and the differing effects of self-efficacy and other expectancy beliefs has to do with the proliferation of expectancy constructs and the similarity of their conceptualizations (see Bong, 1996). Expectancy constructs that can be found in the literature include task-specific self-concept, self-concept of ability, expectancies, expectancy beliefs, expectancy for success, performance expectancies, perceptions of competence, perceptions of task difficulty, self-perceptions of ability, ability perceptions, perceived ability, self-appraisals of ability, perceived control, subjective competence, and, of course, confidence. There is no reason why theorists should

conceptualize expectancy beliefs in identical fashion or agree without clear empirical evidence that one construct is superior to others. No doubt it is likely that one particular conceptualization and definition best explains the role that these judgments play in human motivation and behavior. Consequently, the process of normal science requires that differing conceptualizations be subjected to empirical investigation so that the most useful and explanatory one may emerge and others are "read out" of the discipline. Alternatively, it may be that differing judgments can be found to play differing roles, and so different expectancy constructs may well provide different insights.

Such progress in the evolution of construct and theory would occur if the expectancy beliefs currently in use differed significantly from each other. That is not the case, however. Typically, they are each defined in nearly identical fashion. Compare Boekaerts' (1991) definition of subjective competence as "a person's knowledge, beliefs, and feelings about his capabilities and skills" (p. 2) with Byrne's (1984) definition of self-concept as the self-perceptions that individuals have about their academic abilities, specifically, their "feelings and knowledge about [these] abilities [and] skills" (p. 428). Moreover, expectancy constructs are assessed with questions that, although similar, are just different enough to make comparing findings a formidable task. Contrast a *perceived ability* item, "I can do well on this exam" (Greene & Miller, 1996), with one from math *ability perceptions,* "How have you been doing in math this year?" (Meece et al., 1990), or one from *self-appraisal of ability,* "How do you rate yourself in school ability compared with those in your grade at school?" (Felson, 1984). When these similarly conceptualized but differently operationalized self-perceptions of competence are differently used to suit specific research agendas, researchers are left with the imposing task of sifting through expectancy constructs, determining their "decisive characteristics" (Bong, 1996), evaluating whether findings are consistent or inconsistent with theoretical tenets and prior research, and planning follow-up investigations. Problems are compounded when researchers identify inaccurately defined and used assessments of competence as "self-efficacy" perceptions.

Self-Efficacy and Academic Performances

In academic settings, self-efficacy research has focused primarily on two major areas. One area has explored the link between efficacy beliefs and college major and career choices, particularly in the areas of science and mathematics (e.g., Bores-Rangel, Church, Szendre, & Reeves, 1990; Brown, Lent, & Larkin, 1989; Farmer, Wardrop, Anderson, & Risinger, 1995; Lent, Brown, & Larkin, 1986; see Lent & Hackett, 1987, for a review). Researchers have reported that the mathematics self-efficacy of college undergraduates is more predictive of their mathematics interest and choice of math-related courses and majors than either their prior math achievement or math outcome expectations and that male undergraduates report higher mathematics self-efficacy than do female undergraduates (Hackett, 1985; Hackett & Betz, 1989; Lent, Lopez, & Bieschke, 1991, 1993; Pajares & Miller, 1994, 1995b). This line of inquiry has important implications for counseling and vocational psychology theory and practice, given that findings have provided insights into the career development of young men and women and can be used to develop career intervention strategies.

Studies in the second area have investigated the relationships among efficacy

beliefs, related psychological constructs, and academic motivation and achievement. Self-efficacy has been prominent in studies that have explored its relationship with attributions (Schunk, 1981, 1982a), goal setting (Locke & Latham, 1990; Wood & Locke, 1987), modeling (Schunk, 1981, 1987), problem solving (Bouffard-Bouchard, 1989; Larson, Piersel, Imao, & Allen, 1990), reward contingencies (Schunk, 1983b), self-regulation (Bandura, 1991; Schunk, 1982b; and see Zimmerman and his associates), social comparisons (Bandura & Jourden, 1991; Schunk, 1983a), strategy training (Schunk & Cox, 1986), teaching and teacher education (Ashton & Webb, 1986; Gibson & Dembo, 1984; Woolfolk & Hoy, 1990; Woolfolk, Rosoff, & Hoy, 1990), anxiety and self-concept (Pajares & Miller, 1994, 1995a), and varied academic performances (Bouffard & Vezeau, 1996; Malpass & O'Neil, 1996; Pajares, Shell, and their associates on literacy; Hackett, Pajares, Schunk, and their associates on mathematics; Bandura, 1993, and Zimmerman & Bandura, 1994, across academic domains). Researchers have reported that self-efficacy beliefs are correlated with other self-beliefs, motivation constructs, and academic choices, changes, and achievement, although, as will be seen, effect sizes and relationships greatly depend on the manner in which self-efficacy and criterial tasks are operationalized and assessed.

Findings also support Bandura's (1986) contention that efficacy beliefs mediate the effect of skills or other self-beliefs on subsequent performance by influencing effort, persistence, and perseverance (Bandura & Schunk, 1981; Bouffard-Bouchard, 1990; Lent, Brown, & Larkin, 1984; Schunk & Hanson, 1985). Collins (1982) identified children of low, middle, and high mathematics ability who had, within each ability level, either high or low mathematics self-efficacy. After instruction, the children were given new problems to solve and an opportunity to rework those they missed. Collins reported that ability was related to performance but that, regardless of ability level, children with high self-efficacy completed more problems correctly and reworked more of the ones they missed. Bouffard-Bouchard, Parent, and Larivèe (1991) found that students with high self-efficacy engaged in more effective self-regulatory strategies at each level of ability. Self-efficacy also enhances students' memory performance by enhancing persistence (Berry, 1987). In studies of college students who pursue science and engineering courses, high self-efficacy has been demonstrated to influence the academic persistence necessary to maintain high academic achievement (Lent et al., 1984, 1986).

Zimmerman and his associates have been instrumental in tracing the relationships among self-efficacy perceptions, self-efficacy for self-regulation, academic self-regulatory processes, and academic achievement (Risemberg & Zimmerman, 1992; Zimmerman & Ringle, 1981; Zimmerman, 1989, 1990, 1994, 1995; Zimmerman & Bandura, 1994; Zimmerman & Martinez-Pons, 1990). Zimmerman, Bandura, and Martinez-Pons (1992) used path analysis to demonstrate that academic self-efficacy mediated the influence of self-efficacy for self-regulated learning on academic achievement. Academic self-efficacy influenced achievement directly ($\beta = .21$) as well as indirectly by raising students' grade goals ($\beta = .36$). Other researchers have found that self-efficacy is related to self-regulated learning variables (e.g., Feather, 1988; Fincham & Cain, 1986; Paris & Oka, 1986; Pintrich & Schrauben, 1992; Pokay & Blumenfeld; 1990; Schunk, 1982b, 1985). Findings in this area suggest that students who believe they are

capable of performing academic tasks use more cognitive and metacognitive strategies and persist longer than those who do not (see Pintrich & Garcia, 1991). Pintrich and De Groot (1990) reported a correlation between global academic self-efficacy and both cognitive strategy use and self-regulation through use of metacognitive strategies. In addition, academic self-efficacy correlated with academic performances such as semester and final year grades, in-class seat work and homework, exams and quizzes, and essays and reports. Perceived importance of academic achievement was associated with the outcome variables but was not a significant predictor. Pintrich and De Groot concluded that self-efficacy played a mediational or "facilitative" role in relation to cognitive engagement, that improving self-efficacy might lead to increased use of cognitive strategies and thereby higher performance, and that "students need to have both the 'will' and the 'skill' to be successful in classrooms" (p. 38).

One line of inquiry has assessed judgments of self-efficacy in terms of particularized self-perceptions of competence highly consistent with the criterial task being assessed. This microanalytic assessment requires that if the criterial task involves solving specific mathematics problems, then the efficacy assessment asks students to provide judgments of confidence to solve similar problems (Konstantopolous, 1996; and see Pajares, Schunk, and their colleagues). Similarly, if the task involves reading comprehension, then students are asked to provide judgments of their perceived capability to correctly answer various questions that tap comprehension of the main ideas in a passage (Schunk & Rice, 1993; Shell, Murphy, & Bruning, 1989). If the task involves writing an essay, then students are asked to provide judgments that they possess the various composition, grammar, usage, and mechanical skills on which their writing performance is assessed (Pajares & Johnson, 1994, 1996; Pajares & Valiante, in press; Shell et al., 1995; Shell et al., 1989) (see Table 1).

Schunk and his associates have reported on numerous studies that have examined the role of particularized self-efficacy beliefs in various academic contexts (Schunk, 1982b, 1983b, 1984a, 1984c, 1985, 1987, 1996a, 1996b; Schunk & Cox, 1986; Schunk & Gunn, 1985; Schunk & Hanson, 1985, 1988). For example, Schunk (1981) used path analysis to show that modeling treatments increased persistence and accuracy on division problems by raising children's self-efficacy, which had a direct effect on skill (see also Zimmerman & Ringle, 1981). He later demonstrated that effort attributional feedback of prior performance (e.g., "You've been working hard") raised the self-efficacy expectations of elementary school children, and this increase was in part responsible for increased skill in performance of subtraction problems (Schunk, 1982a). In subsequent experiments, he found that ability feedback (e.g., "You're good at this") had a stronger effect on self-efficacy and performance (Schunk, 1983a; Schunk & Gunn, 1986). Relich, Debus, and Walker (1986) also reported that self-efficacy mediated the role of skill training and attributional feedback and had a direct effect on the performance of division problems of learned helpless sixth graders. Attributional feedback showed a moderate direct effect on performance and a stronger indirect effect mediated by self-efficacy. In another study, Schunk (1984b) reported that mathematics self-efficacy influenced math performance both directly ($\beta = .46$) and indirectly through persistence ($\beta = .30$). Results of these investigations demonstrate that acquisition of cognitive skills, modeling effects, attributional feedback,

and goal setting influence the development of self-efficacy beliefs and that these beliefs, in turn, influence academic performances. Students with similar previous performance attainments and cognitive skills may differ in subsequent performance as a result of differing self-efficacy perceptions because these perceptions mediate between prior attainments and academic performances. As a consequence, such performances are generally better predicted by self-efficacy than by the prior attainments.

Other researchers have attempted to discover whether prediction is increased when particularized efficacy and performance assessments directly correspond. Pajares and Miller (1994) reported that math self-efficacy had stronger direct effects on mathematics problem solving ($\beta = .545$) than did self-concept, perceived usefulness, or prior experience. Self-efficacy mediated the effects of sex and prior experience on self-concept, perceived usefulness, and problem-solving performance. Pajares and Johnson (1996) investigated the influence of writing self-efficacy, writing self-concept, and writing apprehension on high school students' essay writing, using a path model that controlled for the effects of sex and previously assessed writing aptitude. They reported that students' self-efficacy perceptions had a direct effect on their writing performance ($\beta = .395$) and played the mediational role hypothesized by social cognitive theory. Pajares and Valiante (in press) reported a direct effect of $\beta = .356$ and similar relationships with fifth-grade students. Although writing apprehension and performance were correlated in both studies, results showed that the influence of apprehension on performance was largely a result of noncausal covariation with self-efficacy (see also McCarthy, Meier, & Rinderer, 1985; Meier, McCarthy, & Schmeck, 1984; Pajares & Johnson, 1994).

Pajares and Kranzler (1994, 1995a, 1995b) constructed path models that included math self-efficacy, general mental ability, math self-concept, math anxiety, self-efficacy for self-regulation, previous grades in mathematics, and sex. The most substantive effort to extend previous findings involved the inclusion in the model of a measure of general mental ability, or psychometric *g,* rather than a math-related aptitude assessment. The researchers chose an assessment of psychometric *g* because domain-related aptitude assessments as controls in studies of self-efficacy are confounded with the influence of self-beliefs that influence these assessments (Bandura, in press; Dew, Galassi, & Galassi, 1984; Hackett & Betz, 1989). As a consequence, if the prior influence of the self-beliefs is not partialed out, their effect is artificially lessened. Moreover, *g* accounts for the single largest component underlying individual differences in mental ability (see Carroll, 1993) and is acknowledged to be a strong predictor of academic performance (Thorndike, 1986). The key finding from these studies was that the direct effect of self-efficacy on performance ($\beta = .349$) was as strong as the effect of ability ($\beta = .324$). The nonsignificant direct effect of anxiety (Pajares & Kranzler, 1995b) and the reduced effect of self-concept (Pajares & Kranzler, 1994, 1995a) on performance, as well as the influence of self-efficacy on anxiety and self-concept, supported previous findings that the influence of these determinants on academic performances diminishes when self-efficacy is included in a model. These are striking results in light of the particularly stringent test of the influence of self-efficacy that inclusion of a general mental ability measure in the path model provides in an investigation of this type (see Thorndike, 1986).

Pajares (1996b) examined the interplay between self-efficacy judgments and the mathematical problem solving of middle school students mainstreamed in algebra classes. Math self-efficacy made an independent contribution to the problem-solving performance of regular education students ($\beta = .387$) and of gifted students ($\beta = .455$) in a path model that controlled for the effects of math anxiety, cognitive ability, mathematics grades, self-efficacy for self-regulatory learning, and sex. Pajares also reported that girls expressed lower confidence when performance scores did not warrant it and similar confidence when performance scores warranted greater confidence. Although most students were biased toward overconfidence, girls were less biased in that direction, and gifted girls were biased toward underconfidence. Consistent with the findings of Hackett, Meece, and their colleagues, these results suggest that factors are still at work in negatively affecting the mathematics self-beliefs of girls.

What this line of inquiry has demonstrated is that when self-efficacy beliefs closely correspond to the criterial task with which they are compared, prediction is enhanced. Multon et al. (1991) found 36 studies written between 1977 and 1988 on the relationship between self-efficacy and academic performance or persistence that met their criteria for inclusion in a meta-analysis: containing a measure of self-efficacy and academic performance and providing sufficient information to calculate effect size estimates. They computed that efficacy beliefs were related to performance ($r_u = .38$) and accounted for approximately 14% of the variance in academic performance. However, effect sizes depended on specific characteristics of the studies, notably on the types of efficacy and performance measures used. The strongest effects were obtained by researchers who compared specific efficacy judgments with basic cognitive skills measures of performance (.52 versus .36 for performance in course work and .13 for standardized tests), developed highly concordant self-efficacy/performance indexes, and administered them at the same time.

Correlations between self-efficacy and academic performances in investigations in which self-efficacy is microanalytically analyzed and closely corresponds to the criterial task have ranged from $r = .49$ to $r = .70$; direct effects in path analytic studies have ranged from $\beta = .349$ to $\beta = .545$. Results tend to be higher in studies of mathematics than of other academic areas such as reading or writing, but even in these areas relationships are considerably higher than previously obtained if the criteria by which students rate their self-efficacy judgments are used as the criteria for scoring essays or assessing reading comprehension.

As noted by Multon et al. (1991), self-efficacy researchers have sometimes used generalized, global, or multiple-scale self-efficacy measures to predict academic performances. For example, researchers have often operationalized math self-efficacy as the composite score of individuals' judgments of their capabilities to solve math problems, perform math-related tasks, and succeed in math-related courses—the three subscales of the Mathematics Self-Efficacy Scale (MSES; Betz & Hackett, 1983). Randhawa, Beamer, and Lundberg (1993) adapted the MSES for use with high school students and used LISREL procedures to find that the composite self-efficacy score mediated the effect of a generalized math attitude score on math problem solving. The criterial task used by the researchers—the solving of mathematics problems—was conceptually related only to the problems subscale of the MSES. Many of the problems on the self-efficacy

assessment also differed markedly from those on the performance test. Consequently, although generalized mathematics attitudes had a strong direct effect on self-efficacy ($\beta = .64$), they also had as strong a direct effect on performance ($\beta = .44$) as did self-efficacy ($\beta = .32$).

Pajares and Miller (1995b) argued that the mathematics judgments assessed by the MSES are substantively different and tap differing math-related beliefs. Although they have in common that all are math related, their predictive value should largely depend on the nature of the criterial tasks with which they are compared. Consequently, students' judgments of their ability to solve math problems should be more strongly predictive of their ability to solve those problems than should their confidence in their ability to perform other math-related tasks or succeed in math-related courses. Similarly, their judgments of their ability to succeed in math-related courses should be more strongly predictive of their choice to enroll in such courses than should their confidence in their ability to solve specific problems or perform mathematics tasks. Pajares and Miller compared these judgments of capability with two outcome measures: ability to solve the problems on which self-efficacy was assessed and math relatedness of academic majors. Results confirmed that Bandura's (1986) cautions regarding specificity of self-efficacy and performance assessment are well founded. Students' confidence in their ability to solve mathematics problems was a more powerful predictor of their ability to solve those problems than was their confidence in their ability to perform math-related tasks or their confidence in their ability to earn As or Bs in math-related courses. Similarly, their confidence to succeed in such courses was more predictive of their choice of majors that required them to take many of the math-related courses on which they expressed that confidence.

Recall that significant relationships are obtained even with generalized domain-specific self-perceptions, provided that they assess skills and performances in related domains (Multon et al., 1991). Pajares and Miller (1995b) found this phenomenon as well. Each subscale, as well as the full scale, correlated significantly with each performance task. Such relationships attest to the generalizability of self-efficacy perceptions within a domain, but prediction is enhanced as self-efficacy and performance more closely match. One might also question the practical utility of administering a 52-item instrument when greater prediction may be had from a shorter instrument more closely matching the performance task.

Studies that report a lack of relationship between self-efficacy and performance often suffer from problems either in specificity or correspondence. Benson (1989) found that the path from mathematics self-efficacy to performance was not significant. Self-efficacy was assessed with three global items dealing with expected success in a statistics class (e.g., "No matter how hard I study, I will not do well in this class"); performance was the midterm exam grade in a statistics course. Wilhite (1990) found that college students' self-assessment of memory ability was the strongest predictor of their GPA, followed by locus of control. Self-efficacy showed a weak relationship. Efficacy judgments were assessed using a global self-concept measure. Smith, Arnkoff, and Wright (1990) tested the predictive power of three theoretical models on the academic performance of college undergraduates. The researchers concluded that although variables within each model predicted performance to some degree, self-efficacy was a weak

predictor. Self-efficacy was assessed as perceived study skills or test-taking capability and was measured with items such as "Rate how certain you are that you can study at a time and place where you won't get distracted." This was compared with academic performances such as exam grades and course GPA. Cooper and Robinson (1991) compared scores from the courses subscale of the MSES with scores on a performance measure that consisted of solving problems from the Missouri Mathematics Placement Test and reported a low but significant correlation between math self-efficacy and performance. A regression model with math anxiety, the quantitative score on the American College Test (ACT-Q), and prior math experience revealed that self-efficacy did not account for a significant portion of the variance in math performance.

Findings on self-efficacy coincide on two points: When efficacy beliefs are globally assessed and/or do not correspond with the criterial tasks with which they are compared, their predictive value is diminished or can even be nullified; and when efficacy assessments are tailored to the criterial task, prediction is enhanced. In general, there is ample reason to believe that self-efficacy is a powerful motivation construct that works well to predict academic self-beliefs and performances at varying levels but works best when theoretical guidelines and procedures regarding specificity and correspondence are adhered to.

Self-Efficacy and Other Motivation Constructs: Two Illustrative Examples

In some fashion, perceptions of capability play a prominent role in most theories of motivation. Self-concept theorists point out that these percepts of self-worth include judgments of confidence (see Rosenberg & Kapland, 1982; Shavelson & Bolus, 1982). Consequently, self-efficacy is considered an important component of an individual's self-concept. The literature on self-schemas and possible selves provides a concept of self with four dimensions, one of which, the *efficacy* dimension, is characterized by individuals' beliefs about their potentialities (T. Garcia & Pintrich, 1994; Markus, 1977). In attribution theory, the causal attributions that individuals make about the success or failure of their actions are presumed to influence their subsequent performance expectancies (Weiner, 1986). Recent findings suggest that this relationship is reciprocal and that attributions influence motivation and performance largely through the mediational role of self-efficacy (see Bandura, 1995, in press; Schunk, 1991, 1994). And goal theorists concur that self-perceptions of competence are important predictors of goals and outcomes, particularly for ability goals (Ames, 1992; Nicholls, 1984; Urdan & Maehr, 1995). Within the constructs that form the centerpieces of these theories, judgments of capability generally perform the functions that Bandura (1986) hypothesized.

Subsuming beliefs of personal efficacy under other motivation constructs can be problematic in that it can obfuscate important differences between the self-beliefs and minimize the unique contribution that self-efficacy perceptions make to an understanding of motivation and behavior. To illustrate, it may be useful to explore in some depth the differing conceptions of the role of self-efficacy perceptions in two other theoretical perspectives, those of expectancy value theory and self-concept theory.

Self-Efficacy and Expectancy Value

According to expectancy value theory, motivation is primarily a result of individuals' beliefs about the likely outcomes of their actions and of the incentive value they place on those outcomes (Atkinson, 1957; McClelland, 1985; Rotter, 1982). Individuals will be motivated to engage in tasks when they value the outcome expected; they will be less predisposed to perform tasks whose outcomes they do not value. Expectancy value theorists agree that judgments of competence play an interactive role with valued outcomes in determining the tasks in which individuals will engage (Eccles, 1983; Wigfield & Eccles, 1992), but they emphasize the more prominent role of a construct similar to that which Bandura (1986) called *outcome expectations* in influencing motivation and predicting behavior. According to Bandura, judgments of personal competence differ from judgments of the likely consequence that behavior will produce. Outcome expectations are related to efficacy beliefs because these beliefs in part determine the expectations. Individuals who expect success in a particular enterprise anticipate successful outcomes. Students confident in their math skills expect high marks on math exams and expect the quality of their work to reap benefits. The opposite is also true of those who lack such confidence. Students who doubt their math ability envision a low grade before they begin a math exam. The expected results of these imagined performances will be differently envisioned: academic success and other benefits for the former, academic failure and curtailed possibilities for the latter.

Bandura (1984, 1986) argued that because the outcomes people expect are largely dependent on their judgments of what they can accomplish, outcome expectations are unlikely to make much of an independent contribution to predictions of behavior when self-efficacy perceptions are controlled. This is not to say that efficacy and outcome judgments are always consistent. A high sense of efficacy may not result in behavior consistent with that belief if an individual also believes that the outcome of engaging in that behavior will have undesired effects. Some students may realize that strong math skills are essential for a good score on the Graduate Record Examination (GRE) and eligibility for graduate school, which, in turn, may ensure a prestigious career and affluent lifestyle, but low confidence in math abilities may keep them away from certain courses, and they may not bother to take the GRE or apply to graduate school. High self-efficacy and negative outcome expectations are similarly possible.

The distinctions that Bandura (1978a) drew between self-efficacy and outcome expectations, as well as the roles he suggested they each play, are not without controversy. Kirsch (1985) argued that Bandura used the term *outcome expectations* in two different ways. A perceived environmental contingency, Kirsch noted, is an outcome expectation beyond the control of the individual. It is knowledge of logical and immutable consequences, such as knowing that a good score on the GRE results in graduate school admission. These outcome expectations are independent of individuals' perceptions of their own competence. This meaning, Kirsch argued, is at odds with Bandura's claim that "the outcomes one expects derive largely from judgments as to how well one can execute the requisite behavior" (p. 241), for in this sense outcomes are dependent on performance and may well be at the mercy of efficacy beliefs.

Some researchers suggest that outcome expectations cannot so easily be extricated from efficacy beliefs (Eastman & Marzillier, 1984; Kazdin, 1978; Teasdale, 1978). They contend that self-efficacy judgments are dependent on and inextricably intertwined with perceptions of the outcomes envisioned by actions. Therefore, outcome expectations play a large role in creating efficacy perceptions. To illustrate that Bandura oversimplified the variables involved in behavior change, Marzillier and Eastman (1984) used the example of a socially anxious man who is asked to attend a party. To this poor soul, the perceived outcomes are disastrous—people will notice he looks odd and laugh at him, and he will make a fool of himself, be unable to talk to anyone, and drink too much. Marzillier and Eastman argued that these expectations cannot be dissociated from efficacy judgments, that outcome beliefs are as important in determining whether the man will attend the party as his belief in whether he can cope with the demands of the occasion. They argued that individuals infer their efficacy beliefs from imagined outcomes. Consistent with the tenets of expectancy value theory, they suggested that an individual's perception of the outcome and his value of the task necessary to achieve that outcome will regulate his behavior as powerfully as his self-efficacy beliefs, and independently of them.

Bandura (1984) countered that such cart-before-the-horse thinking fails to take into consideration that "one cannot conjure up outcomes without giving thought to what one is doing and how well one is doing it" (p. 232). The man confronted with the decision of whether to attend the party envisions disastrous outcomes largely because he has little confidence in his capabilities to meet the demands associated with parties. Foresightful action requires a causal ordering wherein "human causal thinking places actions before the outcomes that flow from them" (p. 237). It is unlikely that the partyphobic man, when faced with the decision of whether to attend, envisions the disastrous outcomes and concludes that he is an inefficacious partygoer. More likely, the perceived self-inefficacy creates the envisioned outcomes. It is also possible, Bandura argued, to exclude considerations of outcome from judgments of personal efficacy. For example, students are capable of assessing their academic capabilities quite apart from any outcomes they may envision.

Several studies conducted within the theoretical perspective of expectancy value offer support for Bandura's (1984) contentions regarding the roles of self-efficacy and outcome expectations. One such investigation was conducted by Meece et al. (1990), who constructed two structural equation models from the perspective of expectancy value theory to investigate the relationship among mathematics ability perceptions, performance expectancies, perceived importance, anxiety, and mathematics performance in a 2-year longitudinal study of junior high school students. Ability perceptions and performance expectancies were described as "two types of efficacy beliefs" (p. 62), although some of the ability perception items may have tapped something other than perceptions of competence (e.g., "How have you been doing in math this year?"). The authors acknowledged that the performance expectancies represented global estimates of efficacy that work to reduce the predictive power of a statistical model (e.g., "How well do you expect to do in math this year?").

Model 1 tested the effects of perceived ability, expectancies, and importance on anxiety, and Model 2 tested the effects of those four variables on students' GPAs.

In both cases, perceived ability was used as an exogenous variable hypothesized to be causally predominant over the others. Perceived expectancies were hypothesized to have a reciprocal relationship with importance in Model 1 and with importance and anxiety in Model 2. Because Meece et al. (1990) conceptualized ability perceptions and performance expectancies as two types of self-efficacy, they used ability perceptions from Year 1 to predict both anxiety and GPA in Year 2 in an effort to avoid potential problems of multicollinearity. Correlations with grades were higher for the expectancy items than for the importance or anxiety items, and path analysis results revealed that expectancies had a significant direct effect on grades, whereas perceptions of importance did not.

The researchers found that expectancy beliefs and perceived importance were significantly related in both models and noted that Atkinson (1957) had argued that the relationship should be inverse—that individuals place greater value on tasks they believe they can least accomplish. According to social cognitive theory, the perceived importance of a task is in large part the result of the outcome expectation an individual has for a particular task and is related to self-efficacy judgments in much the same way as are outcome expectations. Bandura (1986) argued that because beliefs in part determine expectations, people generally value those things they feel capable of accomplishing and do not place as much value on those for which they have little confidence to perform. It is not unusual, then, that expectations and perceived importance should be related, though the relationship can be complex.

Feather (1988) also used an expectancy value orientation in a path analysis to study the effect of math self-concept, perceived value of mathematics, and sex on the enrollment decisions of university students. Feather defined mathematics self-concept as a reflection of "expectancies of success in mathematics" (p. 381) that "could therefore be classified as self-efficacy expectations" (p. 382) and assessed it with two global items, the first asking students to report their previous mathematics grades and the second asking, "In general, how do you rate your ability to do well at mathematics?" Like Meece et al. (1990), Feather found that perceived ability and importance were correlated. Perceived ability also showed a stronger direct effect on choice of majors than did perceived importance. Although from a differing theoretical orientation, both studies lend support to the hypothesized predictive and mediational role of self-efficacy beliefs, even when domain- rather than task-specifically assessed, and to the hypothesized relationship between self-efficacy and outcome expectations.

Self-Efficacy and Self-Concept

As is the case with self-efficacy and other expectancy beliefs, the conceptual difference between self-efficacy and self-concept is not always clear to researchers or in investigations. Some researchers use the terms synonymously (Reyes, 1984). Others describe self-esteem as a generalized form of self-efficacy (Harter, 1990). Still others refer to academic self-concept as self-perceptions of ability and suggest that one reason why these self-percepts affect performance is because of their effect on students' effort, persistence, and anxiety (Felson, 1984). Eccles, Adler, and Meece (1984), in an overview of self-concept theories, wrote about a self-concept of ability that affects "a variety of achievement behaviors including academic performance, task persistence, and task choice; people with positive

perceptions of their ability approach achievement tasks with confidence and high expectations for success and, consequently, perform better on these tasks" (p. 27).

Self-concept differs from self-efficacy in that self-efficacy is a context-specific assessment of competence to perform a specific task, that is, "an individual's judgment of his or her capabilities to perform given actions" (Schunk, 1991, p. 207). Self-concept is measured at a broader level of specificity and includes the evaluation of such competence and the feelings of self-worth associated with the behaviors in question. Self-concept judgments can be domain specific but are not task specific. Compared to self-efficacy judgments, they are more global and less context dependent. The typical self-concept item "I am quite good at mathematics" (Marsh, 1992) differs from a self-efficacy question that may begin with "How confident are you that you can successfully . . . ." Moreover, self-efficacy and self-concept need not be related. A student may feel highly efficacious in mathematics but without the corresponding positive feelings of self-worth, in part because she may take no pride in accomplishments in this area.

Marsh, Walker, and Debus (1991) saw the distinction between the two constructs as a difference in the source of an individual's judgment. Self-concept judgments, they argued, are based on social and self-comparisons, which they described as "frame of reference effects" (p. 336). Individuals use external and internal comparisons to determine their self-worth. By comparing one's own performance with those of others ("I am a better math student than most of my friends") and also one's own performance in related areas ("I am better at math than at English"), an individual develops a judgment of self-worth—a self-concept. Self-efficacy judgments, on the other hand, focus on the specific ability to accomplish the criterial task; hence, frame of reference effects do not play a prominent role. This may be an arguable basis for a distinction, given that judgments of personal competence are also influenced by such comparisons (Bandura, 1986).

Because judgments of competence are considered integral components of an individual's self-concept, self-efficacy beliefs are often viewed simply as requisite judgments necessary to the creation of self-concept beliefs. Rosenberg and Kapland (1982) wrote that self-concept percepts include judgments of confidence, along with judgments of self-esteem, stability, and self-crystallization. Self-concept theorists view as particularly troubling the loss in practical utility that results from the microanalytic assessment of a particularized judgment matched directly to a criterial task. Most academic outcomes are seldom as particularized as one's capability to solve specific problems or successfully accomplish specific tasks, the levels of specificity at which self-efficacy judgments are most predictive of academic performances. Lent and Hackett (1987) observed that specificity and precision are often purchased at the expense of external validity and practical relevance.

As has been explained, general measures of self-efficacy insensitive to context are weak predictors of academic performances. However, to be practically useful and predictive, the level of specificity of an efficacy assessment should depend on the complexity of the performance criteria with which it is compared. As Bandura (in press) argued, "efficacy beliefs are multifaceted and contextual, but the level of generality of the efficacy items within a given domain of functioning varies depending on the degree of situational resemblance and foreseeability of task

demands" (p. 13). Judgments of competence need not be so microscopically operationalized that their assessment loses all sense of practical utility. Lent et al. (1993) showed how efficacy judgments can be tailored to varying levels of academic outcomes and still remain highly predictive. They compared students' confidence to succeed in math-related courses with three career-related outcomes—intention to take the courses listed on the instrument, grades obtained in math-related courses that students took during the subsequent term, and interest in the math courses listed on the instrument. Self-efficacy beliefs were predictive on each account.

Findings have consistently shown that self-concept is related to academic achievement and to other motivation constructs across domains (see Hattie, 1992). Few researchers have explored the relationships among self-efficacy, self-concept, and academic performances, and results are inconsistent. Marsh et al. (1991) compared the direct effect of achievement on the math self-concept and self-efficacy of fifth graders and reported a stronger direct effect on self-concept than on self-efficacy. Using a similar path model, Chapman and Tunmer (1995) found that the reading performance of beginning readers during their first year of schooling had a stronger effect on their subsequent self-efficacy than on their reading self-concept. Such hypothesized relationships beg the question of which self-belief has the stronger influence on achievement. Relich (1983), as cited in Marsh (1990), assessed math self-concept, math achievement, performance on a mathematics task, and self-efficacy for the task. Achievement correlated equally strongly with domain-specific self-efficacy and self-concept. Specific performance on the math task was more strongly correlated with specifically assessed self-efficacy than with domain-specific self-concept. Pajares and Miller (1994) used path analysis and found that item-specific math self-efficacy beliefs were more predictive of mathematics problem solving than were domain-specific self-concept beliefs.

The empirical focus of this argument again centers on the questions of which self-belief provides the greater explanation and prediction of behavior; the conceptual focus centers on which beliefs individuals attend to as they go about the business of day to day living. As is the case with other expectancy constructs, it is likely that different situations call forth different self-beliefs. When individuals are familiar with task demands, they may call on the task-specific self-efficacy beliefs that closely correspond to the required performance. When task demands are unfamiliar, people must generalize from prior attainments that are perceived as similar to the required task and gauge their perceived competence with self-beliefs they judge more closely correspond to the novel requirements. To account for this, self-efficacy researchers have drawn a distinction between *self-efficacy for performance* and *self-efficacy for learning* (Schunk, 1989, 1996b; Schunk, Hanson, & Cox, 1987; Zimmerman et al., 1992). When students are familiar with the skills required to accomplish an academic task, they can interpret their prior attainments and identify the skills on which to formulate their self-efficacy for performance. At this level, specificity of self-belief and correspondence with task work to maximize prediction of performance. When students are unfamiliar with the specific tasks that confront them, judgments of competence cannot be based on perceived skills related to the tasks, for students are not clear on which skills will be required. At this level, self-efficacy for performance either is lacking or

must be inferred from past attainments in situations perceived as similar to the new one. Students' judgments of their capability that they can learn the material required in the domain in question, on the other hand, relates positively to performance and to subsequent skill and self-efficacy assessments (Schunk, 1996b).

At the domain-specific or self-efficacy for learning levels of generality, self-concept and self-efficacy beliefs may be empirically similar. Skaalvik and Rankin (1996) subjected self-concept items and domain-specific self-efficacy items to confirmatory factor analysis and discovered that they loaded on the same factor, which led them to conjecture that the two may be different measures of the same construct. When they subjected problem-specific self-efficacy items and domain-specific self-concept items to factor analysis, two distinct factors emerged, but a second-order common factor that explained 81% of the variance underlay the measures (see also Bandalos, Yates, & Thorndike-Christ, 1995). These findings led them to suggest that "the traditional distinction between self-concept and self-efficacy may have been overstated in the literature" (p. 8). Social cognitive theorists propose that self-concept and self-efficacy act as common mechanisms of personal agency in the sense that both types of self-beliefs help mediate the influence of other determinants on subsequent behavior and that both "contribute in their own way to the quality of human life" (Bandura, 1986, p. 410).

Future Directions

Research on self-efficacy beliefs in academic settings is currently abundant and thriving. Although much remains to be done, the empirical connection between self-efficacy and academic performances and achievement has by now been reasonably secured. With the greater part of that task behind them, self-efficacy theorists must now chart directions to guide subsequent research and practice, and they must adopt research strategies that will provide practical, relevant, and theoretical insights.

Specificity of Belief and Correspondence With Criterial Tasks

Beyond supporting the hypothesized predictive and mediational role of self-efficacy, results from self-efficacy investigations generally show that, as Bandura (1986, in press) theorized, particularized judgments of capability are better predictors of related outcomes than are more generalized self-beliefs. That is, specific judgments are stronger predictors of the specific performances on which the judgments are based than are broader, less contextual, less task-specific judgments. How could it be otherwise? This can be viewed as begging the question of practical utility earlier alluded to, given that many criterial tasks of interest in the motivation and academic arenas cannot be assessed with the specificity afforded by a performance as particularized as the solution of, say, mathematics problems. Researchers are cautioned, however, that domain specificity should not be misconstrued as an extreme situational specificity that reduces efficacy assessment to an atomistic level. Research findings demonstrating that more generalized self-efficacy perceptions are also good predictors of more generalized performances such as obtained grades, choice of academic majors, and intention to enroll in math-related courses speak to the practical utility both of self-efficacy and of expectancy beliefs in general. Nonetheless, findings support Bandura's (1986, in

press) contention that if the aim of a study is to increase prediction of academic performances or to help distinguish between self-efficacy and other expectancy beliefs, research questions should be formulated with an eye to measuring self-efficacy as specifically as is relevant and useful and also to enhancing the correspondence between self-efficacy and criterial variables.

Generality of Self-Efficacy Beliefs

Some researchers have noted the need to explore the generality of self-efficacy beliefs—that is, the extent to which they relate to, or transfer across, different performance tasks or domains—so as to increase their practical utility (Lent & Hackett, 1987; Multon et al., 1991). Bandura (in press) has identified several conditions under which judgments of competence can generalize across activities. When differing tasks require similar subskills, one may expect that judgments of capability to demonstrate the requisite subskills will predict the differing outcomes. Generality can also take place when the skills required to accomplish dissimilar activities are codeveloped, that is, acquired together. In school, students' mathematics and verbal self-efficacy may generalize if the skills for each subject have been adequately taught and developed by a competent teacher. Subskills required to organize a course of action are themselves governed by broader self-regulatory skills such as knowing how to diagnose task demands or constructing and evaluating alternative strategies. Possession self-regulatory skills can permit students to improve their performances across varied academic activities. Generalizable coping skills work in similar fashion by reducing stress and promoting effective functioning. Self-efficacy should also generalize in academic domains when commonalities are cognitively structured across activities. For instance, if students can be helped to realize that increased effort and persistence result in academic progress and greater understanding in mathematics, it is likely that similar connections may be made to other subject areas. Finally, there are "transforming experiences" that come about as the result of powerful performance attainments and serve to strengthen beliefs in diverse areas of one's life, areas often greatly unrelated. Many doctoral students will attest to the fact that successful completion of a dissertation can dramatically alter their confidence to deal with activities and events unrelated to their scholarly pursuits.

The hypothesized conditions under which judgments of competence should generalize across varied activities and domains provide rich opportunity for empirical investigation that would help trace the genesis of self-beliefs as well as their possible interconnections (see Rokeach, 1960, 1968). Results would inform theoretical contentions about the influence of self-efficacy on academic performances and about the relationship between self-efficacy and other motivation constructs. However, Bandura (in press) cautioned that empirical results verifying that efficacy beliefs generalize across domains as a result of root conditions should not result in the "pursuit of a psychological Grail of generality" (p. 24) that would seek to find root cause for varying self-beliefs. Similar cognitive subskills or strong self regulatory efficacy should aid performance in varied domains, but specific pursuits will usually differ in the specialized competencies they require. With these cautions in mind, understanding the conditions and contexts under which self-beliefs will generalize to differing academic activities offers valuable possibilities for intervention and instructional strategies that may help students

build both competence and the necessary accompanying self-perceptions of competence.

Strength and Accuracy of Self-Perceptions

Past findings suggest that most students are overconfident about their academic capabilities (Hackett & Betz, 1989; Pajares, 1996b; Pajares & Miller, 1994). Bandura (1986) argued that successful functioning is best served by reasonably accurate efficacy appraisals, although the most functional efficacy judgments are those that slightly exceed what one can actually accomplish, for this overestimation serves to increase effort and persistence. But how much confidence is too much confidence, when can overconfidence be characterized as excessive and maladaptive in an academic enterprise, and what factors help create inaccurate self-perceptions? Bandura argued that the stronger the self-efficacy, the more likely are persons to select challenging tasks, persist at them, and perform them successfully. Researchers will have to determine to what degree high self-efficacy demonstrated in the face of low performance attainments ultimately results in these benefits. Efforts to lower students' efficacy percepts or interventions designed to raise already overconfident beliefs should be discouraged, but improving students' calibration—the accuracy of their self-perceptions—will require helping them to better understand what they know and do not know so that they may more effectively deploy appropriate cognitive strategies as they perform a task. The challenge is to accomplish this without lowering confidence and optimism.

On the other end of the efficacy continuum, students who lack confidence in skills they possess are less likely to engage in tasks in which those skills are required, and they may more quickly give up in the face of difficulty. In some studies, researchers have reported that girls perform as capably as boys in varied academic tasks but nonetheless report lower self-efficacy, particularly at higher academic levels (Pajares & Johnson, 1996; Pajares & Miller, 1994, 1995b). In one study, gifted girls were found to be biased toward underconfidence, although most students are generally biased toward overconfidence (Pajares, 1996b). Additional studies are required to discover the extent of these phenomena across academic areas and levels, and why these differences should exist in the face of similar ability and performance. Investigations are particularly needed at lower academic levels, especially those in which these sorts of self-beliefs begin to be created. Exploring the nature of the relationship between efficacy judgments, calibration, performance attainments, and the hypothesized effects of self-efficacy—choice, persistence, and perseverance—continues to be a promising avenue of inquiry.

Sources and Effects of Self-Efficacy Beliefs

Most investigations of self-efficacy in academic settings have sought to determine the predictive value of self-efficacy beliefs on varied performances or motivation constructs. In most cases, the statistical models with self-efficacy as a dependent variable account for only a small portion of the variance. Future investigations might seek to identify sources of efficacy information other than those typically used—aptitude, ability, and previous achievement—so as to trace the genesis and development of self-efficacy beliefs as well as determine how perceptions of efficacy mediate the influence of these sources on subsequent

performances and on other constructs. Schunk (1981, 1982a, 1983a; Schunk & Hanson, 1985) has explored of the influence of attributional feedback, modeling effects, and goal setting on self-efficacy beliefs. It would be useful to develop insights about how and why differing interpretations of similar attainments and from similar sources result in different beliefs, as well as how inaccurate self-perceptions are developed and why they can persist even in the face of subsequent successes and strong performance attainments.

Students cannot accomplish tasks beyond their capabilities simply by believing that they can. Rather, beliefs are, as Peirce observed, "rules for action" (cited in James, 1885/1975, p. 28). As such, beliefs become the internal rules individuals follow as they determine the effort, persistence, and perseverance required to achieve optimally. Researchers have examined the influence of self-efficacy on these variables and reported significant relationships, but it is not yet clear how these connections are made or under what conditions similar self-beliefs can result in different levels of motivation. Because of the survey nature of most investigations, effects are generally assessed in terms of students' self-reported effort and persistence rather than investigator-observed effort and persistence. This has also been the case with self-regulatory practices, which have been self-reported by students rather than observed by investigators. Two strategies are called for. The first is for researchers to assess both the sources and the effects of self-efficacy through direct observation rather than rely on students' self-reports; the second is to increase the use of experimental techniques so as to manipulate sources and effects. Investigators should continue to look to motivation and self-regulatory variables as outcome measures and in real classroom contexts to better understand the relationship between self-efficacy beliefs and other self-beliefs and motivation constructs (see Ames, 1992). Quantitative efforts will have to be complemented by qualitative studies aimed at exploring how efficacy beliefs are developed, how students perceive that these beliefs influence their academic attainments and the academic paths that they follow, and how the beliefs influence choices, effort, persistence, perseverance, and resiliency.

Causal Influence of Self-Efficacy

One of the thorniest problems to confront the study of self-beliefs is that of causality and direction of causality. This chicken-or-egg question has been an important focus of many self-concept studies (Hattie, 1992), and its implications are equally relevant to self-efficacy research. In self-concept research, the issue is one of whether feeling good about oneself is primarily responsible for increased achievement or whether successful performance is largely responsible for stronger feelings of self-worth. Because of the reciprocal nature of human motivation and behavior, it is unlikely that such a question can be resolved. It is possible, however, to develop better understandings of the conditions under which self-efficacy beliefs operate as causal factors—through their influence on choice, effort, and persistence—in human functioning. Although causal modeling and path analytic techniques have proven useful in making causal inferences and testing theoretical tenets, more experimental designs are required in which self-efficacy beliefs are altered and the effects of these changes on academic attainments measured. In keeping with the hypothesized sources of efficacy information, beliefs can be altered using vicarious methods, verbal persuasions, differing

performance feedback, social comparison information, and/or manipulating task complexity. The now typical procedure of testing multivariate relationships between self-efficacy, other motivation constructs, and performance attainments in causal models is an improvement over less complex analyses, but providing insights regarding the causal influence of self-beliefs will require that these procedures be conducted on longitudinal or repeated measures designs.

Collective Efficacy

Perhaps one of the more valuable insights provided by social cognitive theory has been the observation that confidence is both a personal and a social construct—that collective systems such as classrooms, teams of teachers, schools, and even school districts develop a sense of *collective efficacy,* that is, "a group's shared belief in their capabilities to realize given levels of attainment" (Bandura, in press). Students, teachers, and school administrators operate collectively rather than in isolation. As a result, schools develop collective beliefs about the capability of their students to learn, of their teachers to teach and otherwise enhance the lives of students, and of their administrators and policymakers to create environments conducive to those tasks. Schools with high collective efficacy exercise empowering and vitalizing influences on their constituents, and these effects are clearly in evidence—visitors speak of the schools' "atmosphere" or "climate" and describe them as "can-do" or effective schools (see W. W. Purkey, 1979; C. S. Purkey & Smith, 1983). Bandura (1993) reported that collective efficacy mediated the influence of students' socioeconomic status and prior academic achievement and teachers' longevity on the academic achievement of students in various middle schools. The extensive data gathering typically required in studies in which schools are the unit of analysis has prevented researchers from engaging in studies of collective efficacy, but the need and the challenge are there to tap greater insights from this potentially critical construct.

Developmental and Multicultural Perspectives

The context-specific nature of self-efficacy beliefs makes them an ideal vehicle with which to explore the difference in perceptions of competence as a function of factors such as age, race, and ethnicity. A better understanding of the development of academic self-efficacy beliefs, familial and schooling influences, and developmental factors that contribute to changes in self-efficacy will require cross-sectional and longitudinal investigations that assess self-efficacy with allegiance to the theoretical guidelines earlier discussed. More information is also required about how students at various ages, academic levels, or grades use the diverse sources of efficacy information in developing self-efficacy beliefs. Because children judge their capabilities partly by comparing their performances with those of others, future studies should also explore the influence of peers on the development of self efficacy beliefs as well as the social comparative information that students find most useful in developing these beliefs.

Graham's (1994) summary of the literature on the expectancy beliefs of African American students revealed that Black students "maintain undaunted optimism and positive self-regard even in the face of achievement failure" (p. 103). Similar findings have been reported with Hispanic American samples (Lay & Wakstein, 1985). These findings have resulted primarily from studies of generalized, do-

main-specific self-concept of ability. When perceptions of competence are assessed as item-specific self-efficacy judgments, results can differ. Pajares and Kranzler (1995a, 1995b) reported that the mathematics self-efficacy of African American students was lower than that of White peers, and Pajares and Johnson (1996) found that the writing self-efficacy of Hispanic high school students was lower than that of non-Hispanic White students. In each case, despite differences in self-efficacy, minority students reported positive math self-concepts. It may be that beliefs at differing levels of specificity perform different functions for minority students (see Edelin & Paris, 1995). Graham acknowledged that self-efficacy is an important factor in the study of motivation but noted that it has been too sparsely examined in either race homogeneous or race heterogeneous studies. Self-efficacy beliefs assessed at differing levels of specificity might help explain the relationship between perceptions of competence and academic achievement, how these perceptions are related to other motivation factors, and whether the origins of these beliefs differ for minority children and across socioeconomic levels.

Social Contexts

Bandura (1986) observed that there are a number of conditions under which self-efficacy beliefs do not perform their influential, predictive, or mediational role in human functioning. In *prejudicially structured systems* (p. 393), for example, students may find that no amount of skillful effort will bring about desired outcomes. In such cases, students may possess the necessary skill and high self-efficacy required to achieve, but they may choose not to undertake a task because they lack the necessary incentives. Self-efficacy will also have no bearing on performance if schools lack the effective teachers, necessary equipment, or resources required to aid students in the adequate performance of academic tasks. Bandura suggested that when social constraints and inadequate resources impede academic performances, self efficacy may exceed actual performance, because it is not so much a matter that students do not know what to do but rather that they are unable to do what they know. This observation may be insightful in light of findings regarding self-beliefs of minority students in some contexts. There is need to explore the role that schools play as social systems for developing and cultivating self-efficacy beliefs, as well as the roles that the various incentives and disincentives such systems create play in the development of students' self-efficacy (and see Bandura, 1995).

From Research to Practice

Although self-efficacy research has made notable contributions to the understanding of self-regulatory practices and academic motivation, the connection from theory to practice has been slow. Classroom teachers and policymakers may well be impressed by the force of research findings arguing that self-efficacy beliefs are important determinants of performance and mediators of other self-beliefs, but they are apt to be more interested in useful educational implications, sensible intervention strategies, and practical ways to alter self-efficacy beliefs when they are inaccurate and debilitating to children.

Some self-efficacy researchers have suggested that teachers would be well served by paying as much attention to students' perceptions of competence as to

actual competence, for it is the perceptions that may more accurately predict students' motivation and future academic choices (Hackett & Betz, 1989). Assessing students' self-efficacy can provide teachers with important insights. As noted earlier, researchers have demonstrated that self-efficacy beliefs strongly influence the choices of majors and career decisions of college students. In some cases, unrealistically low math self-efficacy perceptions, not lack of capability or skill, may in part be responsible for avoidance of math-related courses and careers, and this is more likely to be the case with women than with men (Hackett & Betz, 1989). If this is so, in addition to skill improvement, researchers must acquaint schools with ways to identify these inaccurate judgments and must aid in designing and implementing appropriate interventions to alter them. School and teaching practices that foster both competence and the necessary accompanying confidence should be identified, as well as practices that "convert instructional experiences into education in inefficacy" (Bandura, in press). In a related vein, investigations of teacher efficacy and the influence such self-beliefs have on teacher practices and student outcomes will help explain how teachers' beliefs influence students' beliefs and achievement. The caution in this regard is to ensure that teacher efficacy assessments correspond to the outcomes with which they are compared.

There are cautions that should be taken as regards the nature and focus of interventions to increase self-efficacy. As is presently the case with self-esteem, there is the danger that self-efficacy may soon come in a kit. Bandura's (1986) emphasis that enactive attainment is the most influential source of self-efficacy information has important implications for the self-enhancement model of academic achievement which contends that, to increase achievement, educational efforts should focus on raising students' feelings of self-worth or of competence. This is usually accomplished through programs that emphasize building self-beliefs through verbal persuasion methods. Social cognitive theory shifts that emphasis and focuses on a joint effort to raise competence and confidence primarily through successful experience with the performance at hand, through authentic mastery experiences. Interventions should be designed accordingly.

Intertheoretical Cross Talk

Knowledge, competence, and various forms of self-knowledge and self-belief act in concert to provide adequate explanations of behavior (Bandura, 1986; Pintrich & Schunk, 1995). Such explanations cannot be had without considering the role that each may play in human decision making and functioning in a given context. This rich and often complex interplay may create situations in which self-efficacy, or any other type of self-referent judgment, is neither the most important influence on nor especially predictive of behavior (Schunk, 1991). Moreover, human functioning is such that discordances between beliefs and between belief and action are not only possible but likely. As James (1885/1975) observed, we may often find that "the greatest enemy of any one of our truths may be the rest of our truths" (p. 43). For example, some students may be highly confident of their academic ability, but, if the outcomes they expect are dismal (social rejection by peers) or if this confidence is accompanied by the belief that their ability is "fixed" (Dweck & Leggett, 1988), situations can occur under which it is doubtful they will behave in concert with their efficacy beliefs. Conversely, low self-efficacy may be overcome by valued outcomes, potential rewards, or competing self-beliefs.

Bandura (1984) has argued that because individuals' beliefs of personal competence "touch, at least to some extent, most everything they do" (p. 251), and because self-efficacy beliefs mediate to a great extent the effect of other determinants of behavior, when these determinants are controlled, self-efficacy judgments should prove excellent predictors of choice and direction of behavior. Human behavior is multiply determined, however, and its understanding and explanation require an appreciation of the interplay among the determinants that act as common mechanisms of personal agency. Commonality of mechanism, Bandura cautioned, should not be confused with exclusivity of mechanism. Hence, as self-beliefs and other constructs vie for predictive supremacy of academic outcomes, one need not fear that perceived self efficacy will "usurp the lion's share of the variance in human conduct" (p. 252). It serves no research agenda to engage in a duel of self-beliefs when deeper understandings of human behavior may be better had by exploring how, why, and under what conditions certain self-perceptions are especially useful and predictive.

It seems clear that to develop more complete understandings of the sources of this variance, researchers with differing theoretical allegiances should engage in greater intertheoretical cross talk and investigative collaboration using research designs and statistical models that incorporate the various constructs operationalized and used in a manner consistent with the construct's theoretical home. For example, researchers incorporating self-perceptions of capability into studies of self-concept might ensure that these self-perceptions are assessed at a level of specificity consistent with the outcome variables under investigation. Results would then be more easily comparable to those of self-efficacy investigations and help inform the tenets of social cognitive theory. For their part, self-efficacy researchers would take the same methodological precautions when assessing and using other motivation constructs. In studies requiring the use of self-report instruments, researchers might conceptualize and assess a construct by using instruments consistent with those created by researchers from the construct's theoretical home, in addition to alternative conceptualizations or definitions, so as to shed light on the role of the differing conceptualizations. Such efforts would be instrumental in identifying the contexts in which certain motivation constructs may be better predictors of human functioning as well as the unique role that each construct plays in the general development of self-regulatory skills. The result would be a clearer and deeper understanding of the nature of the interplay between self-efficacy and its motivational cousins.

References

Abelson, R. (1979). Differences between belief systems and knowledge systems. *Cognitive Science, 3,* 355–366.

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84,* 261–271.

Ashton, P. T., & Webb, R. B. (1986). *Making a difference: Teachers' sense of efficacy and student achievement.* New York: Longman.

Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review, 64,* 359–372.

Bandalos, D. L., Yates, K., & Thorndike-Christ, T. (1995). Effects of math self-concept, perceived self-efficacy, and attributions for failure and success on test anxiety. *Journal of Educational Psychology, 87,* 611–623.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84,* 191–215.
Bandura, A. (1978a). Reflections on self-efficacy. *Advances in Behavioural Research and Therapy, 1,* 237–269.
Bandura, A. (1978b). The self system in reciprocal determinism. *American Psychologist, 33,* 344–358.
Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37,* 122–147.
Bandura, A. (1983). Self-efficacy determinants of anticipated fears and calamities. *Journal of Personality and Social Psychology, 45,* 464–469.
Bandura, A. (1984). Recycling misconceptions of perceived self-efficacy. *Cognitive Therapy and Research, 8,* 231–255.
Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice Hall.
Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist, 44,* 1175–1184.
Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational Behavior and Human Decision Processes, 50,* 248–287.
Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist, 28,* 117–148.
Bandura, A. (Ed.). (1995). *Self-efficacy in changing societies.* New York: Cambridge University Press.
Bandura, A. (in press). *Self-efficacy: The exercise of control.* New York: Freeman.
Bandura, A., & Jourden, F. J. (1991). Self-regulatory mechanisms governing the motivational effects of goal systems. *Journal of Personality and Social Psychology, 60,* 941–951.
Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology, 41,* 586–598.
Barling, J., & Abel, M. (1983). Self-efficacy beliefs and tennis performance. *Cognitive Therapy and Research, 7,* 265–272.
Benson, J. (1989). Structural components of statistical test anxiety in adults: An exploratory study. *Journal of Experimental Education, 57,* 247–261.
Berry, J. M. (1987, September). *A self-efficacy model of memory performance.* Paper presented at the meeting of the American Psychological Association, New York.
Betz, N. E., & Hackett, G. (1983). The relationship of mathematics self-efficacy expectations to the selection of science-based college majors. *Journal of Vocational Behavior, 23,* 329–345.
Boekaerts, M. (1991). Subjective competence: Appraisals and self-assessments. *Learning and Instruction, 1,* 1–17.
Bong, M. (1996). Problems in academic motivation research and advantages and disadvantages of solutions. *Contemporary Educational Psychology, 21,* 149–165.
Bores-Rangel, E., Church, A. T., Szendre, D., & Reeves, C. (1990). Self-efficacy in relation to occupational consideration and academic performance in high school equivalency students. *Journal of Counseling Psychology, 37,* 407–418.
Bouffard, T., & Vezeau, C. (1996, April). *Self-regulation and the self-system: A longitudinal study of the role of self-efficacy among elementary school children.* Paper presented at the Annual Meeting of the American Educational Research Association, New York.
Bouffard-Bouchard, T. (1989). Influence of self-efficacy on performance in a cognitive task. *Journal of Social Psychology, 130,* 353–363.
Bouffard-Bouchard, T. (1990). Influence of self-efficacy on performance in a cognitive

task. *Journal of Social Psychology, 130,* 353–363.
Bouffard-Bouchard, T., Parent, S., & Larivèe, S. (1991). Influence of self-efficacy on self-regulation and performance among junior and senior high-school aged students. *International Journal of Behavioral Development, 14,* 153–164.
Brown, S. D., Lent, R. D., & Larkin, K. C. (1989). Self-efficacy as a moderator of scholastic aptitude-academic performance relationships. *Journal of Vocational Behavior, 35,* 64–75.
Byrne, B. M. (1984). The general/academic self-concept nomological network: A review of construct validation research. *Review of Educational Research, 54,* 427–456.
Carroll, J. B. (1993). *Human cognitive abilities: A survey of factor-analytic studies.* New York: Cambridge University Press.
Chapman, J. W., & Tunmer, W. E. (1995, April). *Reading self-perceptions and beginning reading achievement of first-year school children.* Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco.
Collins, J. L. (1982, March). *Self-efficacy and ability in achievement behavior.* Paper presented at the Annual Meeting of the American Educational Research Association, New York.
Cooper, S. E., & Robinson, D. A. G. (1991). The relationship of mathematics self-efficacy beliefs to mathematics anxiety and performance. *Measurement and Evaluation in Counseling and Development, 24,* 4–11.
Davis, F. W., & Yates, B. T. (1982). Self-efficacy expectancies versus outcome expectancies as determinants of performance deficits and depressive affect. *Cognitive Therapy and Research, 6,* 23–35.
Dew, K. M. H., Galassi, J. P., & Galassi, M. D. (1984). Math anxiety: Relations with situational test anxiety, performance, physiological arousal, and math avoidance behavior. *Journal of Counseling Psychology, 31,* 580–583.
Dewey, J. (1933). *How we think.* Boston: D. C. Heath.
Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95,* 256–272.
Eastman, C., & Marzillier, J. S. (1984). Theoretical and methodological difficulties in Bandura's self-efficacy theory. *Cognitive Therapy and Research, 8,* 213–229.
Eccles, J. (1983). Expectancies, values, and academic behaviors. In J. T. Spence (Ed.), *Achievement and achievement motives: Psychological and sociological approaches* (pp. 75–146). San Francisco: Freeman.
Eccles, J., Adler, T., & Meece, J. L. (1984). Sex differences in achievement: A test of alternate theories. *Journal of Personality and Social Psychology, 46,* 26–43.
Edelin, K. C., & Paris, S. G. (1995, April). *African American students' efficacy beliefs and the match between beliefs and performance.* Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco.
Farmer, H. S., Wardrop, J. L., Anderson, M. Z., & Risinger, R. (1995). Women's career choices: Focus on science, math, and technology careers. *Journal of Counseling Psychology, 42,* 155–170.
Feather, N. T. (1988). Values, valences, and course enrollment: Testing the role of personal values within an expectancy-valence framework. *Journal of Educational Psychology, 80,* 381–391.
Felson, R. B. (1984). The effect of self-appraisals of ability on academic performance. *Journal of Personality and Social Psychology, 47,* 944–952.
Fincham, F., & Cain, K. (1986). Learned helplessness in humans: A developmental analysis. *Developmental Review, 6,* 138–156.
Garcia, M. E., Schmitz, J. M., & Doerfler, L. A. (1990). A fine-grained analysis of the role of self-efficacy in self-initiated attempts to quit smoking. *Journal of Consulting*

and Clinical Psychology, 58, 317–322.
Garcia, T., & Pintrich, P. R. (1994). Regulating motivation and cognition in the classroom: The role of self-schemas and self-regulatory strategies. In D. Schunk & B. Zimmerman (Eds.), *Self-regulation of learning and performance: Issues and educational applications* (pp. 127–154). Hillsdale, NJ: Erlbaum.
Gibson, S., & Dembo, M. (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology, 76,* 569–582.
Graham, S. (1994). Motivation in African Americans. *Review of Educational Research, 64,* 55–118.
Greene, B. A., & Miller, R. B. (1996). Influences on achievement: Goals, perceived ability, and cognitive engagement. *Contemporary Educational Psychology, 21,* 181–192.
Hackett, G. (1985). The role of mathematics self-efficacy in the choice of math-related majors of college women and men: A path analysis. *Journal of Counseling Psychology, 32,* 47–56.
Hackett, G., & Betz, N. E. (1989). An exploration of the mathematics self-efficacy/mathematics performance correspondence. *Journal for Research in Mathematics Education, 20,* 261–273.
Harter, S. (1982). The perceived competence scale for children. *Child Development, 53,* 87–97.
Harter, S. (1990). Causes, correlates, and the functional role of global self-worth: A life-span perspective. In R. J. Sternberg & J. Kolligian (Eds.), *Competence considered* (pp. 67–97). New Haven, CT: Yale University Press.
Hattie, J. (1992). *Self-concept.* Hillsdale, NJ: Erlbaum.
James, W. (1975). *Pragmatism.* Cambridge, MA: Harvard University Press. (Original work published 1885)
James, W. (1985). *Psychology: The briefer course.* Notre Dame, IN: University of Notre Dame Press. (Original work published 1892)
Kazdin, A. E. (1978). Conceptual and assessment issues raised by self-efficacy theory. *Advances in Behavioural Research and Therapy, 1,* 177–185.
Kirsch, I. (1985). Self-efficacy and expectancy: Old wine with new labels. *Journal of Personality and Social Psychology, 49,* 824–830.
Konstantopolous, S. (1996, April). *Math self-efficacy and intrinsic values as predictors of math performance.* Paper presented at the Annual Meeting of the American Educational Research Association, New York.
Kuhn, T. S. (1970). *The structure of scientific revolutions* (2nd ed.). Chicago: University of Chicago Press.
Larson, L. M., Piersel, W. C., Imao, A. K., & Allen, S. J. (1990). Significant predictors of problem-solving appraisal. *Journal of Counseling Psychology, 37,* 482–490.
Lay, R., & Wakstein, J. (1985). Race, academic achievement, and self-concept of ability. *Research in Higher Education, 22,* 43–64.
Lee, C. (1982). Self-efficacy as a predictor of performance in competitive gymnastics. *Journal of Sport Psychology, 4,* 405–409.
Lee, C. (1983). Self-efficacy and behavior as predictors of subsequent behavior in an assertiveness training programme. *Behavior Research and Therapy, 21,* 225–232.
Lee, C. (1984). Accuracy of efficacy and outcome expectations in predicting performance in a simulated assertiveness task. *Cognitive Therapy and Research, 8,* 37–48.
Lent, R. W., Brown, S. D., & Larkin, K. C. (1984). Relation of self-efficacy expectations to academic achievement and persistence. *Journal of Counseling Psychology, 31,* 356–362.
Lent, R. W., Brown, S. D., & Larkin, K. C. (1986). Self-efficacy in the prediction of academic performance and perceived career options. *Journal of Counseling Psychol-*

ogy, 33, 265–269.
Lent, R. W., & Hackett, G. (1987). Career self-efficacy: Empirical status and future directions. *Journal of Vocational Behavior, 30,* 347–382.
Lent, R. W., Lopez, F. G., & Bieschke, K. J. (1991). Mathematics self-efficacy: Sources and relation to science-based career choice. *Journal of Counseling Psychology, 38,* 424–430.
Lent, R. W., Lopez, F. G., & Bieschke, K. J. (1993). Predicting mathematics-related choice and success behaviors: Test of an expanded social cognitive model. *Journal of Vocational Behavior, 42,* 223–236.
Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting and task performance.* Englewood Cliffs, NJ: Prentice Hall.
Maddux, J. E., & Stanley, M. A. (Eds.). (1986). Self-efficacy theory in contemporary psychology [Special issue]. *Journal of Social and Clinical Psychology, 4*(3).
Malpass, J. R., & O'Neil, H. F. (1996, April). *Self-regulation, goal orientation, self-efficacy, worry, and math achievement.* Paper presented at the Annual Meeting of the American Educational Research Association, New York.
Manning, M. M., & Wright, T. L. (1983). Self-efficacy expectancies, outcome expectancies, and the persistence of pain control in childbirth. *Journal of Personality and Social Psychology, 45,* 421–431.
Markus, H. (1977). Self-schemata and processing information about the self. *Journal of Personality and Social Psychology, 35,* 63–78.
Marsh, H. W. (1990). Influences of internal and external frames of reference on the formation of math and English self-concepts. *Journal of Educational Psychology, 82,* 107–116.
Marsh, H. W. (1992). *SDQIII.* Campbelltown, Australia: University of Western Sydney, Publication Unit.
Marsh, H. W., Walker, R., & Debus, R. (1991). Subject-specific components of academic self-concept and self-efficacy. *Contemporary Educational Psychology, 16,* 331–345.
Marzillier, J. S., & Eastman, C. (1984). Continuing problems with self-efficacy theory: A reply to Bandura. *Cognitive Therapy and Research, 8,* 257–262.
McCarthy, P., Meier, S., & Rinderer, R. (1985). Self-efficacy and writing. *College Composition and Communication, 36,* 465–471.
McClelland, D. C. (1985). How motives, skills, and values determine what people do. *American Psychologist, 40,* 812–825.
Mead, G. H. (1982). *The individual and the social self: Unpublished work of George Herbert Mead* (D. L. Miller, Ed.). Chicago: University of Chicago Press.
Meece, J. L., Wigfield, A., & Eccles, J. S. (1990). Predictors of math anxiety and its influence on young adolescents' course enrollment and performance in mathematics. *Journal of Educational Psychology, 82,* 60–70.
Meier, S., McCarthy, P. R., & Schmeck, R. R. (1984). Validity of self-efficacy as a predictor of writing performance. *Cognitive Therapy and Research, 8,* 107–120.
Moe, K. O., & Zeiss, A. M. (1982). Measuring self-efficacy expectations for social skills: A methodological inquiry. *Cognitive Therapy and Research, 6,* 191–205.
Multon, K. D., Brown, S. D., & Lent, R. W. (1991). Relation of self-efficacy beliefs to academic outcomes: A meta-analytic investigation. *Journal of Counseling Psychology, 38,* 30–38.
Nicholls, J. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review, 91,* 328–346.
Nisbett, R., & Ross, L. (1980). *Human inference: Strategies and shortcomings of social judgment.* Englewood Cliffs, NJ: Prentice-Hall.
O'Leary, A. (1985). Self-efficacy and health. *Behavior Research and Therapy, 23,* 437–

451.
Pajares, F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research, 62,* 307–332.
Pajares, F. (1996a, April). *Assessing self-efficacy beliefs and academic outcomes: The case for specificity and correspondence.* Paper presented at the Annual Meeting of the American Educational Research Association, New York.
Pajares, F. (1996b). Self-efficacy beliefs and mathematical problem solving of gifted students. *Contemporary Educational Psychology, 21,* 325–344.
Pajares, F., & Johnson, M. J. (1994). Confidence and competence in writing: The role of self-efficacy, outcome expectancy, and apprehension. *Research in the Teaching of English, 28,* 316–334.
Pajares, F., & Johnson, M. J. (1996). Self-efficacy beliefs in the writing of high school students: A path analysis. *Psychology in the Schools, 33,* 163–175.
Pajares, F., & Kranzler, J. (1994). Self-efficacy, self-concept, and general mental ability in mathematical problem-solving. *Florida Educational Research Council Research Bulletin, 26,* 8–32.
Pajares, F., & Kranzler, J. (1995a, April). *Competence and confidence in mathematics: The role of self-efficacy, self-concept, anxiety, and ability.* Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco.
Pajares, F., & Kranzler, J. (1995b). Self-efficacy beliefs and general mental ability in mathematical problem-solving. Contem*porary Educational Psychology, 26,* 426–443.
Pajares, F., & Miller, M. D. (1994). The role of self-efficacy and self-concept beliefs in mathematical problem-solving: A path analysis. *Journal of Educational Psychology, 86,* 193–203.
Pajares, F., & Miller, M. D. (1995a, August). *Mathematics self-efficacy and mathematical problem-solving: Implications of using varying forms of assessment.* Paper presented at the meeting of the American Psychological Association, New York.
Pajares, F., & Miller, M. D. (1995b). Mathematics self-efficacy and mathematics outcomes: The need for specificity of assessment. *Journal of Counseling Psychology, 42,* 190–198.
Pajares, F., & Valiante, G. (in press). Predictive and mediational roles of the self-efficacy beliefs of upper elementary school students. *Journal of Educational Research.*
Paris, S. G., & Oka, E. (1986). Children's reading strategies, metacognition and motivation. *Developmental Review, 6,* 25–36.
Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology, 82,* 33–40.
Pintrich, P. R., & Garcia, T. (1991). Student goal orientation and self-regulation in the college classroom. In M. Maehr & P. R. Pintrich (Eds.), *Advances in motivation and achievement: Goals and self-regulatory processes* (Vol. 7, pp. 371–402). Greenwich, CT: JAI Press.
Pintrich, P. R., & Schrauben, B. (1992). Students' motivational beliefs and their cognitive engagement in classroom academic tasks. In D. Schunk & J. Meece (Eds.), *Student perceptions in the classroom: Causes and consequences* (pp. 149–183). Hillsdale, NJ: Erlbaum.
Pintrich, P. R., & Schunk, D. H. (1995). *Motivation in education: Theory, research, and applications.* Englewood Cliffs, NJ: Prentice Hall.
Pokay, P., & Blumenfeld, P. C. (1990). Predicting achievement early and late in the semester: The role of motivation and use of learning strategies. *Journal of Educational Psychology, 82,* 41–50.
Posner, G. J., Strike, K. A., Hewson, P. W., & Gertzog, W. A. (1982). Accommodation

of a scientific conception: Toward a theory of conceptual change. *Science Education, 66,* 211–227.
Purkey, C. S., & Smith, M. S. (1983). Effective schools: A review. *Elementary School Journal, 83,* 427–452.
Purkey, W. W. (1979). *Self-concept and school achievement.* Englewood Cliffs, NJ: Prentice Hall.
Randhawa, B. S., Beamer, J. E., & Lundberg, I. (1993). Role of mathematics self-efficacy in the structural model of mathematics achievement. *Journal of Educational Psychology, 85,* 41–48.
Relich, J. D., Debus, R. L., & Walker, R. (1986). The mediating role of attribution and self-efficacy variables for treatment effects on achievement outcomes. *Contemporary Educational Psychology, 11,* 195–216.
Reyes, L. H. (1984). Affective variables and mathematics education. *The Elementary School Journal, 84,* 558–581.
Risemberg, R., & Zimmerman, B. J. (1992). Self-regulated learning in gifted students. *Roeper Review, 15,* 98–101.
Rokeach, M. (1960). *The open and closed mind.* New York: Basic Books.
Rokeach, M. (1968). *Beliefs, attitudes, and values: A theory of organization and change.* San Francisco: Jossey-Bass.
Rosenberg, M., & Kapland, H. B. (1982). *Social psychology of the self-concept.* Arlington Heights, IL: Harlan Davidson.
Rotter, J. B. (1982). Social learning theory. In N. T. Feather (Ed.), *Expectations and actions: Expectancy-value models in psychology* (pp. 241–260). Hillsdale, NJ: Erlbaum.
Schunk, D. H. (1981). Modeling and attributional effects on children's achievement: A self-efficacy analysis. *Journal of Educational Psychology, 73,* 93–105.
Schunk, D. H. (1982a). Effects of effort attributional feedback on children's perceived self-efficacy and achievement. *Journal of Educational Psychology, 74,* 548–556.
Schunk, D. H. (1982b). Verbal self-regulation as a facilitator of children's achievement and self-efficacy. *Human Learning, 1,* 265–277.
Schunk, D. H. (1983a). Developing children's self-efficacy and skills: The roles of social comparative information and goal setting. *Contemporary Educational Psychology, 8,* 76–86.
Schunk, D. H. (1983b). Reward contingencies and the development of children's skills and self-efficacy. *Journal of Educational Psychology, 75,* 511–518.
Schunk, D. H. (1984a). Enhancing self-efficacy and achievement through rewards and goals: Motivational and informational effects. *Journal of Educational Research, 78,* 29–34.
Schunk, D. H. (1984b). Self-efficacy perspective on achievement behavior. *Educational Psychologist, 19,* 48–58.
Schunk, D. H. (1984c). Sequential attributional feedback and children's achievement behaviors. *Journal of Educational Psychology, 76,* 1159–1169.
Schunk, D. H. (1985). Self-efficacy and classroom learning. *Psychology in the Schools, 22,* 208–223.
Schunk, D. H. (1987). Peer models and children's behavioral change. *Review of Educational Research, 57,* 149–174.
Schunk, D. H. (1989). Self-efficacy and achievement behaviors. *Educational Psychology Review, 1,* 173–208.
Schunk, D. H. (1991). Self-efficacy and academic motivation. *Educational Psychologist, 26,* 207–231.
Schunk, D. H. (1994). Self-regulation of self-efficacy and attributions in academic settings. In D. H. Schunk & B. J. Zimmerman (Eds.), *Self-regulation of learning and*

performance: Issues and educational implications (pp. 75–99). Hillsdale, NJ: Erlbaum.
Schunk, D. H. (1996a). Goal and self-evaluative influences during children's cognitive skill learning. *American Educational Research Journal, 33,* 359–382.
Schunk, D. H. (1996b, April). *Self-efficacy for learning and performance.* Paper presented at the Annual Meeting of the American Educational Research Association, New York.
Schunk, D. H., & Cox, P. D. (1986). Strategy training and attributional feedback with learning disabled students. *Journal of Educational Psychology, 78,* 201–209.
Schunk, D. H., & Gunn, T. P. (1985). Modeled importance of task strategies and achievement beliefs: Effects on self-efficacy and skill development. *Journal of Early Adolescence, 5,* 247–258.
Schunk, D. H., & Gunn, T. P. (1986). Self-efficacy and skill development: Influence of task strategies and attributions. *Journal of Educational Research, 79,* 238–244.
Schunk, D. H., & Hanson, A. R. (1985). Peer models: Influence on children's self-efficacy and achievement. *Journal of Educational Psychology, 77,* 313–322.
Schunk, D. H., & Hanson, A. R. (1988). Influence of peer-model attributes on children's beliefs and learning. *Journal of Educational Psychology, 81,* 431–434.
Schunk, D. H., Hanson, A. R., & Cox, P. D. (1987). Peer-model attributes and children's achievement behaviors. *Journal of Educational Psychology, 79,* 54–61.
Schunk, D. H., & Rice, J. M. (1993). Strategy fading and progress feedback: Effects on self-efficacy and comprehension among students receiving remedial reading services. *Journal of Special Education, 27,* 257–276.
Shavelson, R. J., & Bolus, R. (1982). Self-concept: The interplay of theory and models. *Journal of Educational Psychology, 74,* 3–17.
Shell, D. F., Colvin, C., & Bruning, R. H. (1995). Self-efficacy, attributions, and outcome expectancy mechanisms in reading and writing achievement: Grade-level and achievement-level differences. *Journal of Educational Psychology, 87,* 386–398.
Shell, D. F., Murphy, C. C., & Bruning, R. H. (1989). Self-efficacy and outcome expectancy mechanisms in reading and writing achievement. *Journal of Educational Psychology, 81,* 91–100.
Skaalvik, E., & Rankin, R. J. (1996, April). *Self-concept and self-efficacy: Conceptual analysis.* Paper presented at the Annual Meeting of the American Educational Research Association, New York.
Smith, R. J., Arnkoff, D. B., & Wright, T. L. (1990). Test anxiety and academic competence: A comparison of alternative models. *Journal of Counseling Psychology, 37,* 313–321.
Teasdale, J. D. (1978). Self-efficacy: Toward a unifying theory of behavioural change. *Advances in Behavioural Research and Therapy, 1,* 211–215.
Thorndike, R. L. (1986). The role of general ability in prediction. *Journal of Vocational Behavior, 29,* 332–329.
Urdan, T. C., & Maehr, M. (1995). Beyond a two goal theory of motivation: A case for social goals. *Review of Educational Research, 65,* 213–244.
Weiner, B. (1986). *An attributional theory of motivation and emotion.* New York: Springer-Verlag.
Wigfield, A., & Eccles, J. (1992). The development of achievement task values: A theoretical analysis. *Developmental Review, 12,* 265–310.
Wilhite, S. C. (1990). Self-efficacy, locus of control, self-assessment of memory ability, and study activities as predictors of college course achievement. *Journal of Educational Psychology, 82,* 696–700.
Wood, R. E., & Locke, E. A. (1987). The relation of self-efficacy and grade goals to academic performance. *Educational and Psychological Measurement, 47,* 1013–

1024.
Woolfolk, A. E., & Hoy, W. K. (1990). Prospective teachers' sense of efficacy and beliefs about control. *Journal of Educational Psychology, 82,* 81–91.
Woolfolk, A. E., Rosoff, B., & Hoy, W. K. (1990). Teachers' sense of efficacy and their beliefs about managing students. *Teaching & Teacher Education, 6,* 137–148.
Zimmerman, B., & Ringle, J. (1981). Effects of model persistence and statement of confidence on children's self-efficacy and problem-solving. *Journal of Educational Psychology, 73,* 485–493.
Zimmerman, B. J. (1989). A social cognitive view of self-regulated academic learning. *Journal of Educational Psychology, 81,* 329–339.
Zimmerman, B. J. (1990). Self-regulating academic learning and achievement: The emergence of a social cognitive perspective. *Educational Psychology Review, 2,* 173–201.
Zimmerman, B. J. (1994). Dimensions of academic self-regulation: A conceptual framework for education. In D. H. Schunk & B. J. Zimmerman (Eds.), *Self-regulation of learning and performance: Issues and educational implications* (pp. 3–21). Hillsdale, NJ: Erlbaum.
Zimmerman, B. J. (1995). Self-efficacy and educational development. In A. Bandura (Ed.), *Self-efficacy in changing societies* (pp. 202–231). New York: Cambridge University Press.
Zimmerman, B. J. (1996, April). Measuring and mismeasuring academic self-efficacy: Dimensions, problems, and misconceptions. Symposium presented at the Annual Meeting of the American Educational Research Association, New York.
Zimmerman, B. J., & Bandura, A. (1994). Impact of self-regulatory influences on writing course attainment. *American Educational Research Journal, 31,* 845–862.
Zimmerman, B. J., Bandura, A., & Martinez-Pons, M. (1992). Self-motivation for academic attainment: The role of self-efficacy beliefs and personal goal setting. *American Educational Research Journal, 29,* 663–676.
Zimmerman, B. J., & Martinez-Pons, M. (1990). Student differences in self-regulated learning: Relating grade, sex, and giftedness to self-efficacy and strategy use. *Journal of Educational Psychology, 82,* 51–59.

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