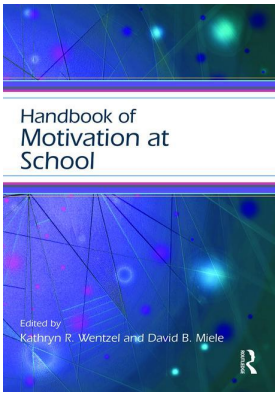

Handbook of Motivation at School

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Self-Efficacy Theory in Education

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SELF-EFFICACY THEORY IN EDUCATION

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The focus of this chapter is on the role of self-efficacy in educational contexts. *Self-efficacy* is defined as one's perceived capabilities for learning or performing actions at designated levels (Bandura, 1997). Since Bandura (1977) introduced self-efficacy to the psychological literature, researchers have explored its role in varied domains including education, business, athletics, careers, health, and wellness.

Researchers have shown that self-efficacy influences learning, motivation, achievement, and self-regulation (Multon, Brown, & Lent, 1991; Schunk & Pajares, 2009; Schunk & Usher, 2012; Williams & Williams, 2010). In educational settings, self-efficacy can affect learners' choices of activities, effort expended, persistence, interest, and achievement (Pajares, 1996b, 1997; Schunk & DiBenedetto, 2014; Schunk & Usher, 2012; Usher, 2009; Usher & Pajares, 2008). Compared with students who doubt their capabilities, those with high self-efficacy participate more readily, work harder, persist longer, show greater interest in learning, and achieve at higher levels (Bandura, 1997; Schunk, 2012).

We initially provide background information on self-efficacy showing how it is situated in Bandura's (1986) social cognitive theory. We discuss sources, effects, and types of self-efficacy and how it differs from other conceptions of personal competence. Some key variables affecting self-efficacy are described, and methods for assessing self-efficacy are explained. Research is summarized investigating the role of self-efficacy in learning and motivation to include self-efficacy for self-regulated learning. The chapter concludes with suggestions for future research on self-efficacy in education.

SOCIAL COGNITIVE THEORY

Bandura (1986) contended that human functioning involved a dynamic interplay among personal, behavioral, and environmental influences. In this conception of *triadic reciprocality*, personal variables such as cognitions and affects, behaviors, and environmental variables interact and influence one another.

Social cognitive theory stresses the idea of human *agency*, or the belief that one can exert a large measure of control over the important events in one's life. Agency reflects the

notion of *empowerment*, or the process of gaining power through goal-directed actions, and self-efficacy is an integral means for becoming more empowered (Cattaneo & Chapman, 2010).

The reciprocal nature of the influences on human functioning suggests that individuals as agents contribute to their personal well-being by improving their emotional, cognitive, or motivational processes, increasing their behavioral competencies, or altering their environmental conditions. Others can assist in the development of agents. In school, teachers are responsible for promoting academic learning of their students. Using social cognitive theory as a framework, teachers can improve their students' emotional states and help correct faulty beliefs and habits of thinking (personal factors), raise their academic skills and self-regulation (behaviors), and alter the school and classroom structures (environmental factors) to ensure student success. Given that personal, behavioral, and environmental variables interact, influencing one type of variable (e.g., self-efficacy—a personal variable) potentially can affect other variables (i.e., personal, behavioral, and environmental).

SOURCES AND EFFECTS OF SELF-EFFICACY

Self-efficacy is hypothesized to influence behaviors and environments and in turn be affected by them (Bandura, 1986, 1997). Students who feel more efficacious about learning should be more apt to engage in self-regulated learning (e.g., set goals, use effective learning strategies, monitor their comprehension) and create effective environments for learning (e.g., eliminate or minimize distractions, find effective study partners). In turn, self-efficacy can be influenced by behavioral outcomes such as goal progress and achievement and by environmental inputs such as feedback from teachers and social comparisons with peers (see Schunk, 2012, for a recent review).

Bandura (1997) postulated that people acquire information to gauge self-efficacy from actual performances, vicarious (e.g., modeled) experiences, forms of social persuasion, and physiological indexes (Table 3.1), and researchers have substantiated the importance of these four sources (Joët, Usher, & Bressoux, 2011; Usher, 2009). How students interpret their performances should provide the most reliable influence on self-efficacy because performances are tangible indicators of one's capabilities. Performances viewed as successful should raise self-efficacy and those deemed as failures should lower

Table 3.1 Sources and Effects of Self-Efficacy

Sources
• Actual performances
• Vicarious experiences
• Forms of social persuasion
• Physiological indexes
Effects
• Motivation (choices, effort, persistence)
• Learning
• Self-regulation
• Achievement

it, although an occasional failure or success after many successes or failures may not have much impact.

Individuals acquire information about their capabilities vicariously through knowledge of how others perform (Bandura, 1997). Similarity to others is a cue for gauging self-efficacy (Schunk, 2012). Observing similar others succeed can raise observers' self-efficacy and motivate them to try the task because they are apt to believe that if others can do it they can as well. A vicarious increase in self-efficacy, however, can be negated by subsequent performance failure. Because people often seek models with qualities they admire and capabilities to which they aspire, models can help instill beliefs that influence the course and direction of one's life (Schunk & Pajares, 2009).

Individuals also can develop self-efficacy beliefs as a result of social persuasions (e.g., "I know you can do it") they receive from others (Bandura, 1997), but social persuasions must be believable and from credible persons, because persuaders must cultivate people's beliefs that success is attainable. Positive feedback can raise individuals' self-efficacy, but the increase will not endure if they subsequently perform poorly (Schunk, 2012).

People acquire self-efficacy information from physiological and emotional states such as anxiety and stress (Bandura, 1997). Strong emotional reactions to a task provide cues about an anticipated success or failure. When individuals experience negative thoughts and fears about their capabilities (e.g., feeling nervous thinking about speaking in front of a large group), those reactions can lower self-efficacy and trigger additional stress and agitation that help ensure an inadequate performance.

Information gained from these sources does not automatically affect self-efficacy. Individuals interpret the results of events. Attribution theory predicts that people form *attributions* (perceived causes) for outcomes (Graham & Williams, 2009); for example, they did well on a test because they studied hard. These interpretations are used to make self-efficacy judgments (Pajares, 1996b).

Although self-efficacy is important, it is not the only influence on behavior (Bandura, 1997). No amount of self-efficacy will produce a competent performance when students lack the needed skills to succeed (Schunk, 2012). Students' *values* (perceptions of importance and utility of learning) also can affect behavior (Wigfield, Cambria, & Eccles, 2012; Wigfield, Tonks, & Klauda, this volume). Even students who feel highly efficacious in science may not take some science courses that they do not value because they believe these courses are not germane to their goal of becoming a medical doctor. Also important are *outcome expectations*, or beliefs about the anticipated outcomes of actions (Bandura, 1997). Students typically engage in activities that they believe will result in positive outcomes and avoid actions that they believe may lead to negative outcomes. Students who feel highly efficacious about learning the content in a course may not work diligently if they believe that no matter how well they do the instructor will not reward them with a high grade. Assuming requisite skills and positive values and outcome expectations, self-efficacy is a key influence on students' motivation, learning, self-regulation, and achievement (Schunk, 2012).

Self-efficacy can have multiple effects in educational contexts (Bandura, 1986, 1997; Table 3.1). Self-efficacy can influence the choices people make (Patall, 2012). Individuals tend to select tasks and activities in which they feel self-efficacious and avoid those in which they do not. Unless people believe that their actions will produce the desired consequences, they have little incentive to engage in those actions. Self-efficacy also helps determine how much effort people expend on an activity, how long they persevere when

confronting obstacles, and how resilient they are in the face of difficulties (Joët et al., 2011; Moos & Azevedo, 2009).

In turn, higher self-efficacy predicts achievement outcomes (Fast et al., 2010). People with a strong sense of self-efficacy approach difficult tasks as challenges to be mastered. They set challenging goals and remain committed to them, heighten and sustain their efforts in the face of failure, and more quickly recover their sense of self-efficacy after setbacks (Schunk, 2012). Conversely, people with low self-efficacy may believe that things are more difficult than they really are—a belief that can foster anxiety and stress and leave few choices for how to solve problems. Self-efficacy can lead to a self-fulfilling prophecy in which people accomplish what they believe they can.

TYPES OF SELF-EFFICACY

Various types of self-efficacy have been identified by researchers; Table 3.2 provides definitions and examples. In Bandura's (1977) early clinical studies with persons with snake phobias, participants possessed the skills to perform the particular behaviors (e.g., touch the snake) but did not perform them because of feared consequences. Their *self-efficacy for performance* was low until they overcame these fears. In school, students spend some time reviewing what they have learned, but much time is devoted to learning skills. Thus, it is meaningful to speak of *self-efficacy for learning*, as well as *self-efficacy for self-regulated learning* (discussed later).

Many educational situations require that students work in teams to accomplish a task. *Collective self-efficacy* refers to the perceived capabilities of the group, team, or larger social entity (Bandura, 1997). Collective self-efficacy is not simply the average of individuals' self-efficacy but rather refers to the members' perceived capabilities to attain a common goal by working together. The collective self-efficacy of school professional staff bears a positive relation to the achievement of students in the school (Bandura, 1993).

Table 3.2 Types of Self-Efficacy

Type	Definition (Perceived Capability to . . .)	Example
Self-Efficacy for Performance	Perform previously learned behaviors	Jump up and down 10 times
Self-Efficacy for Learning	Learn new skills, strategies, and behaviors	Learn to apply the quadratic formula
Self-Efficacy for Self-Regulated Learning	Generate thoughts, feelings, and behaviors systematically oriented toward attainment of learning goals	Study physics text to prepare for an exam
Collective Self-Efficacy	Work together as a group to attain common goals	Prepare a research-based group presentation
Teacher (Instructional) Self-Efficacy	Help promote student learning	Help students understand the causes of the Civil War
Collective Teacher (Instructional) Self-Efficacy	Work together as a group to influence student outcomes	Develop a new algebra curriculum

Self-efficacy has been applied to teachers as well as to students. *Teacher* (or *instructional) self-efficacy* refers to personal beliefs about one's capabilities to help students learn (Klassen, Tze, Betts, & Gordon, 2011; Woolfolk Hoy, Hoy, & Davis, 2009). Teacher self-efficacy should influence the same types of activities that student self-efficacy affects: choice of activities, effort, persistence, and achievement (Bandura, 1997). Self-efficacy theory predicts that teachers with higher self-efficacy should be more apt to develop challenging activities, help students succeed, and persist with students who have difficulties. Ashton and Webb (1986) found that teachers with higher self-efficacy were likely to have a positive classroom environment, support students' ideas, and meet the learning needs of all students. High teacher self-efficacy is positively associated with teachers' use of praise, individual attention, and monitoring students' learning, as well as with higher student achievement. In their review of research conducted between 1998 and 2009, Klassen et al. (2011) found only moderate support for the relation of teacher self-efficacy to student outcomes. Research by Holzberger, Philipp, and Kunter (2013) demonstrated a reciprocal relation between teacher self-efficacy and instructional quality, with the relation of instructional quality to self-efficacy the stronger.

An important aspect of teacher self-efficacy may be self-efficacy for classroom management. Researchers have shown that teachers with lower self-efficacy for classroom management are more likely to experience emotional exhaustion (Dicke et al., 2014) and burnout (Aloe, Amo, & Shanahan, 2014). Conversely, teachers with higher classroom management self-efficacy report greater job satisfaction (Klassen & Chiu, 2010). And these relations may begin before teachers enter the profession. Research by Chestnut and Cullen (2014) showed that self-efficacy for classroom management, instructional strategies, and student engagement relates positively to preservice teachers' commitment to the teaching profession.

Researchers also have investigated the role of *collective teacher* (or *instructional*) *self-efficacy*, or teachers' beliefs that their collective capabilities can influence students' outcomes (Goddard, Hoy, & Woolfolk Hoy, 2000; Henson, 2002; Klassen et al., 2011). It develops as teachers work collaboratively to achieve common goals (performance accomplishments), learn from one another and have mentors who serve as role models (vicarious experiences), receive encouragement and support from administrators (forms of social persuasion), and work together to cope with difficulties and alleviate stress (physiological indexes; Henson, 2002). As collective self-efficacy is strengthened, teachers remain motivated to collaborate to improve students' learning. Collective teacher self-efficacy bears a positive relation to teachers' job satisfaction (Caprara, Barbaranelli, Borgogni, & Steca, 2003; Klassen, Usher, & Bong, 2010), which is a key ingredient in teacher retention.

Distinctions with Other Variables

Other variables bear conceptual similarity to self-efficacy (Schunk & Zimmerman, 2006). Self-efficacy is a belief about what one is capable of doing or learning; it is not the same as actually knowing what to do (i.e., skill, ability; Schunk & Pajares, 2009). Students with higher skills and abilities tend to be more self-efficacious, but there is no automatic relation between self-efficacy and academic ability. Pajares and Kranzler (1995) tested the joint contribution of mental ability and self-efficacy to mathematics performance and found that self-efficacy made an independent contribution to the prediction of performance. Collins (1982) identified high-, average-, and low-ability students in mathematics, and within each of these three levels identified students with high and

low self-efficacy. Students were given problems to solve and were told they could rework those they missed. Across all ability levels, students with higher self-efficacy solved more problems correctly and chose to rework more problems they missed than did learners with lower self-efficacy.

Self-efficacy also is not the same as *self-concept*, or one's collective self-perceptions formed through experiences with and interpretations of the environment and influenced by reinforcements and evaluations by others (Shavelson & Bolus, 1982). Self-concept is multidimensional and hierarchically organized, with a general self-concept on top and subarea self-concepts below (Brunner et al., 2010; Pajares & Schunk, 2001, 2002). Self-perceptions of specific competencies (e.g., self-efficacy) influence subarea self-concepts (e.g., history, biology), which combine to form the academic self-concept.

Because self-efficacy involves perceived capabilities in specific areas, it should contribute to self-concept (Bong & Skaalvik, 2003; Pajares & Schunk, 2001, 2002). Another distinction lies in the normative nature of self-concept. Many investigators posit that self-concept heavily reflects how one views oneself relative to others (Schunk & Pajares, 2009). This idea is reflected in the *big-fish-little-pond effect* (Dai & Rinn, 2008; Marsh & Hau, 2003): Students in selective schools may hold lower self-concepts than those in less selective schools (Seaton, Marsh, & Craven, 2010). Although self-efficacy can be affected by normative experiences (e.g., comparisons with peers), the strongest influence on it comes from personal accomplishments (Bandura, 1997). In short, self-efficacy beliefs are cognitive, goal-referenced, relatively context-specific, and future-oriented judgments of competence that are malleable due to their task dependence. Self-concept beliefs are normative, typically aggregated, hierarchically structured, and past-oriented self-perceptions that are more stable due to their generality.

Self-esteem is a general affective evaluation of one's self that often includes judgments of self-worth (Covington, 2009; Schunk & Pajares, 2009). Whereas self-efficacy beliefs revolve around questions of *can* (e.g., Can I write this essay? Can I solve this problem?), self-esteem beliefs reflect questions of *feel* (e.g., Do I like myself? How do I feel about myself as a writer?). One's beliefs about what one can do may bear little relation to how one feels about oneself. Some students with high self-esteem may not feel efficacious about their academic capabilities. Conversely, some students with high self-efficacy for learning may hold lower self-esteem because their classmates view them negatively.

Self-efficacy beliefs also differ from *outcome expectations* (discussed earlier). In educational settings, self-efficacy often helps to determine the outcomes one expects. Students who are confident in their academic skills expect high grades, whereas those who lack confidence in their academic skills envision low grades before they begin examinations or enroll in courses. However, self-efficacy can be inconsistent with one's expected outcomes (Bandura, 1997). High self-efficacy may not result in behavior consistent with that belief when individuals also believe that the outcome of engaging in that behavior will have undesired effects, perhaps because external variables weaken the link between behaviors and outcomes. An academically self-efficacious student may not apply to particular universities whose entrance requirements are rigorous and whose acceptance rates are low.

The notion of *perceived control* (or *agency*) differs from self-efficacy. Perceived control reflects the extent that one believes that one can exert control over the important outcomes in one's life (Bandura, 1997; Deci & Ryan, 2012). Skinner, Wellborn, and Connell (1990) distinguished three types of beliefs that affect perceived control. Strategy beliefs are outcome expectations about what influences success, such as, "With hard work I can

earn good grades." Capacity beliefs such as self-efficacy refer to personal capabilities (e.g., "I can study hard for tests."). Control beliefs are expectations about doing well without reference to means (e.g., "I can do well if I try.").

Although self-efficacy is a key component of perceived control (Bandura, 1997), it is not the only one (Ryan, 1993). People who believe they can control what they learn and perform are more apt to initiate and sustain behaviors directed toward those ends than are individuals who hold a low sense of control. However, a responsive environment is necessary for self-efficacy to exert its effects (Bandura, 1997). People may believe they can control their use of learning strategies, effort, and persistence, yet still hold a low sense of self-efficacy for learning because they feel that the learning is unimportant and not worth the investment of time (i.e., low perceived value). Or they may feel highly self-efficacious for learning yet make no effort to do so because they believe that in their present environment learning will not be rewarded (negative outcome expectation).

Finally, self-efficacy differs from the lay term *self-confidence*, or a general capability self-belief that often fails to specify the object of the belief (e.g., one who exudes self-confidence). Although self-confident individuals often are self-efficacious, there is no automatic relation between these variables. As Bandura (1997) noted, persons can be highly confident that they will fail to perform a particular task (low self-efficacy).

Variables Affecting Self-Efficacy

Academic self-efficacy can be influenced by many variables. Especially important are those associated with development, families, and social and educational contexts.

Development

Young children often feel self-efficacious about performing tasks and may overestimate what they can do, but the accuracy of their self-efficacy judgments (i.e., how well they correspond to actual performances) typically improves with development (Davis-Kean et al., 2008; Wigfield & Eccles, 2002). With the more-efficient information processing that develops, children become capable of engaging in increasingly complicated procedures (Davis-Kean et al., 2008). Thus, they are better able to weigh and combine sources of self-efficacy information, assess task requirements, and compare those requirements to their perceived capabilities. This situation means that children's perceptions of their capabilities may decline with development (Lepper, Corpus, & Iyengar, 2005; Wigfield et al., 2012). In addition to developmental influences, this decline has been attributed to several other variables (discussed in this section), including greater competition, more norm-referenced grading, less teacher attention to individual learner progress, and school transitions (Schunk & Meece, 2006; Wigfield et al., 2012).

It is not uncommon for children to report overconfidence about accomplishing difficult tasks (Wigfield et al., 2012). Even when they are given feedback indicating that they have performed poorly, their self-efficacy may not decline. The incongruence between children's self-efficacy and their actual performance can arise when children lack task familiarity and do not fully understand what is required to execute a task successfully. As they gain experience, their accuracy improves. Children may also be unduly swayed by certain task features and decide based on these that they can or cannot perform the task. In subtraction, for example, children may focus on how many numbers or columns the problems contain and judge problems with fewer columns as less difficult than those

with more columns, even when the former are conceptually more difficult. This is an instance where higher self-efficacy is problematic because students feel unrealistically overconfident and not motivated to seek help and improve their skills (see later section on self-efficacy assessment). As children's capability to focus on multiple features improves, so does their accuracy.

Children may not understand what a capable performance entails. In writing, for example, it is difficult for them to know how clearly they can express themselves or whether their writing skills are improving. Children may believe they can write well when in fact their writing is below normal for their grade level. As they develop, children gain task experience and engage more often in peer social comparisons, which improve the accuracy of their self-assessments. The correspondence between self-efficacy and performance also can be increased by giving children opportunities to practice self-evaluation and with instructional interventions that convey clear information about children's skills or learning progress (Schunk & Pajares, 2009).

Families

The earliest influences on children's beliefs about their capabilities (e.g., self-efficacy) occur within families (Pomerantz, Cheung, & Qin, 2012). Self-efficacy is affected by family *capital*, which includes resources and assets (Bradley & Corwyn, 2002)—for example, financial and material resources (e.g., income, assets), human (nonmaterial) resources (e.g., education levels), and social resources (e.g., those obtained through social networks and connections). Children's perceptions of competence and motivation to learn are affected by the family context (Raftery, Grolnick, & Flamm, 2012). Especially beneficially are homes rich in activities and materials that arouse children's curiosity and offer challenges that can be met (Schunk & Pajares, 2009). Family members who are better educated and have wide social connections are apt to stress education to their children and enroll them in programs (e.g., schools, camps) that foster their self-efficacy and learning.

Parents who provide warm, responsive, and supportive home environments, who encourage exploration and stimulate curiosity, and who provide play and learning materials accelerate their children's intellectual development. Because mastery experiences constitute the most powerful source of self-efficacy information, parents who arrange for their children to experience various forms of mastery are more apt to develop efficacious youngsters than parents who arrange fewer opportunities. Such experiences occur in homes enriched with activities and in which children have freedom to explore (Schunk & Pajares, 2009).

Family members are important models. Those who model ways to cope with difficulties, persistence, and effort strengthen their children's self-efficacy. Family members who encourage their children to try different activities and support and encourage their efforts help to develop children who feel more capable of meeting challenges.

Social Contexts

As children develop, peers become increasingly important (Wentzel, Russell, & Baker, 2014). Parents who steer their children toward efficacious peers provide opportunities for vicarious increases in self-efficacy. When children observe similar peers succeed, they are likely to feel more self-efficacious and be motivated to try the task themselves (Schunk & Meece, 2006).

Peer influence also operates through *crowds*, which are large groups of peers with whom students associate (Wentzel et al., 2014). Students in crowds tend to be highly similar in interests and behaviors, which enhances the likelihood of influence by modeling. Crowds help define students' opportunities for interactions, observations of others' interactions, and access to activities. Over time, crowd members become more similar to one another in their academic self-efficacy.

Peer groups promote motivational socialization (Wentzel et al., 2014). Changes in children's motivation for schooling across the school year are predicted by their peer group membership at the start of the year. Children affiliated with highly motivated groups change positively, whereas those in less motivated groups change negatively. Steinberg, Brown, and Dornbusch (1996) tracked students from entrance into high school until their senior year and found that students who entered high school with similar grades but affiliated with academically oriented crowds achieved better during high school than students who became affiliated with less academically oriented crowds. Peer group academic socialization can influence the individual members' and the group's academic self-efficacy (Schunk & Pajares, 2009).

Educational Contexts

Researchers have shown that competence beliefs such as self-efficacy, as well as their value of academics, decline as students advance through school (Wigfield et al., 2012). Many school practices can retard the development of academic self-efficacy, especially among students who are poorly prepared to cope with ascending academic challenges. Lock-step sequences of instruction frustrate some students who fail to grasp skills and increasingly fall behind (Bandura, 1997). However, ability groupings can weaken the self-efficacy of students relegated to lower groups. In general, classrooms that allow for much social comparison tend to lower self-efficacy for students who find their performances deficient to those of peers.

Periods of transition in schooling bring factors into play that can affect self-efficacy (Schunk & Meece, 2006). Elementary students remain with the same teacher and peers for most of the school day; children receive much attention and individual progress is stressed. In middle school, however, children move from class to class for subjects and are grouped with some peers whom they do not know. Evaluation becomes normative, and there is less teacher attention to individual progress. The widely expanded social reference group and the shift in evaluation standards require students to reassess their academic capabilities, which may then decline. But decline is not inevitable. Friedel, Cortina, Turner, and Midgley (2010) found that efficacy beliefs remained stable across the elementary–middle school transition and were predicted by teachers' emphasizing mastery goals stressing progress in learning. This supports the idea that teacher and classroom variables can influence self-efficacy.

SELF-EFFICACY ASSESSMENT

As self-efficacy research has grown, researchers have moved beyond Bandura's (1977) original definition and assessment methodology. The earliest self-efficacy studies were conducted in clinical settings. For example, Bandura, Adams, and Beyer (1977) worked with adults with snake phobias who initially were given self-efficacy and behavioral tests. Items consisted of progressively more-threatening encounters with a snake (e.g., touch it, allow it to sit in one's lap). For the self-efficacy assessment, participants first designated

which tasks they believed they could perform and then judged how certain they were that they could perform the tasks they designated. Generality of self-efficacy was assessed by participants completing these two self-efficacy assessments for the same tasks but with a different type of snake.

In these early studies, self-efficacy and skills were assessed for specific tasks. Participants were not asked for a general rating of how they felt about interacting with snakes. After judging self-efficacy for the specific tasks, participants were given the opportunity to perform those tasks.

Early educational research studies used a similar methodology. Schunk (1981), working with children with low long-division skills, had children judge self-efficacy, after which they completed a skills test. For the self-efficacy assessment, children were shown pairs of problems; for each pair, the two problems were comparable in form and difficulty. Children judged how certain they were that they could solve problems of that type (i.e., problems that looked like those and were about as easy or difficult as those). Skill test problems corresponded to those on the self-efficacy test in form and difficulty.

This type of methodology allows researchers to compare self-efficacy and skill test problems to determine *calibration*, which refers to how well self-efficacy relates to actual performance (Schunk & Usher, 2012). High calibration means that self-efficacy predicts performance, as when people judge that they are capable of performing a task and then perform it or when they judge that they are not capable of performing a task and then do not perform it. People show low calibration (i.e., poor correspondence between self-efficacy and performance) when they judge they are capable of performing a task but then do not perform it or when they judge they are not capable of performing a task but then perform it.

Calibration is important in education (Schunk & Pajares, 2009). Students who overestimate what they can accomplish are apt to have frequent failures, which should negatively affect their self-efficacy, motivation, and learning. Students who underestimate their capabilities may be reluctant to attempt tasks, thereby limiting skill and self-efficacy development. Bandura (1997) recommended that self-efficacy that slightly exceeds what one can do is desirable because it can strengthen motivated behavior (e.g., choice, effort, persistence).

How self-efficacy is conceptualized determines how it should be assessed. Since self-efficacy refers to judgments of what one can do, it is consistent with Bandura's (1977) conceptualization to assess self-efficacy for such tasks as solving different algebraic equations in two unknowns, reading various passages to locate main ideas, and analyzing different environmental scenarios to determine whether they could sustain plant life.

But researchers have assessed self-efficacy at more general levels. Researchers have asked participants to respond to self-efficacy items asking how capable they feel in mathematics, how well they can study when there are other more interesting things to do, and how certain they are that they can get teachers to help them when they get stuck on a problem. To answer these types of questions, students must draw on their long-term memories and integrate their perceptions across different situations. Such items broaden the conceptualization of self-efficacy beyond specific domains.

There is some evidence for a generalized sense of self-efficacy (Smith, 1989). Educational conditions may foster general self-efficacy because school curricula are structured to promote positive transfer—new learning builds on prior learning. Thus, students who generally perform well in mathematics may approach long division with high self-efficacy because they judge themselves capable in the prerequisite skills (e.g., estimating, multiplying, subtracting). Students who feel themselves capable of performing the

component skills of writing a research paper (e.g., identifying a topic, conducting a research literature review, organizing and outlining the paper) should feel more efficacious about writing a research paper even if they have never done one than students who feel less self-efficacious in the component areas.

Evidence of self-efficacy generality does not refute the domain-specific conceptualization of self-efficacy, but it is critical to understand how students integrate information from different sources to arrive at generalized judgments. Such research will add to our understanding of how self-efficacy can be assessed in valid and reliable ways.

RESEARCH EVIDENCE

Educational researchers have investigated the role that self-efficacy plays in learning, motivation, and self-regulation. In this section we discuss findings from correlational and experimental research and from studies investigating predictive utility.

Correlational Research

Research results show that self-efficacy bears a positive relation to educational outcomes (Williams & Williams, 2010). Researchers have obtained significant and positive correlations between self-efficacy for learning or performing tasks and subsequent achievement on those tasks (Aguayo et al., 2011; Joët et al., 2011; Schunk & Pajares, 2009). Correlations between academic self-efficacy and performance tend to be higher in investigations in which self-efficacy corresponds closely to the criterion task (i.e., task-specific self-efficacy). Self-efficacy explains approximately 25% of the variance in the prediction of academic outcomes (Pajares, 2006).

Multon et al. (1991) used meta-analytic procedures and found that self-efficacy related positively to academic performance and accounted for 14% of the variance, although effect sizes depended on characteristics of the studies. Stronger effects were obtained by researchers who compared specific self-efficacy judgments with skill performance measures, developed self-efficacy and skill measures that were highly congruent, and administered them close in time. In another meta-analysis, Stajkovic and Luthans (1998) found across 114 studies that the average correlation between self-efficacy and work-related performance was .38.

Self-efficacy also correlates positively with indexes of self-regulation (McInerney, 2011; Schunk & Usher, 2011). Pintrich and De Groot (1990) found that self-efficacy, self-regulation, and cognitive strategy use by middle school students were positively intercorrelated and predicted achievement. Bouffard-Bouchard, Parent, and Larivee (1991) found that high school students with high self-efficacy for problem solving displayed greater performance monitoring and persisted longer than did students with lower self-efficacy. Zimmerman and Bandura (1994) showed that self-efficacy for writing correlated positively with college students' goals for course achievement, self-evaluative standards (satisfaction with potential grades), and achievement.

Experimental Research

Researchers have explored the effects of instructional and other classroom variables on self-efficacy in diverse settings (Schunk & Usher, 2012). A general conception of the model used in much of this research is shown in Figure 3.1 (Schunk & Pajares, 2009).

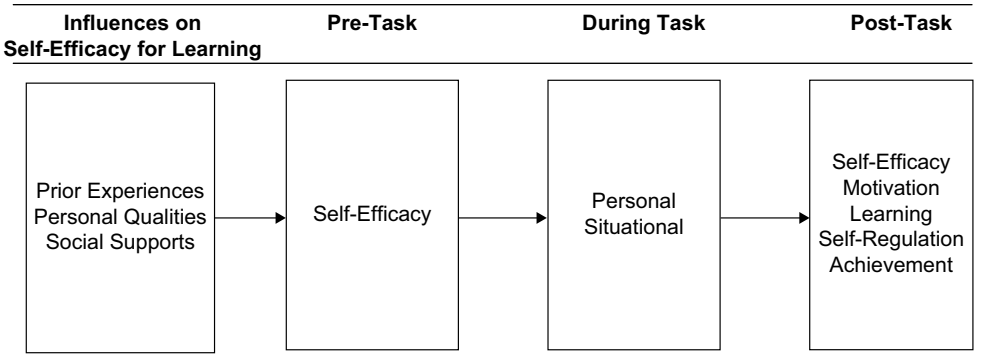

Figure 3.1 Self-Efficacy Model in Achievement Settings

At the outset of an activity, students differ in their self-efficacy for learning as a function of their prior experiences, personal qualities (e.g., abilities, attitudes), and social supports. The latter include the extent that parents, coaches, and teachers encourage students to learn, facilitate their access to resources necessary for learning (e.g., materials, facilities), and teach them self-regulatory strategies that enhance skill development. As students engage in activities they are influenced by personal factors (e.g., goal setting, cognitive information processing) and situational variables (e.g., feedback, social comparisons). These influences provide students with cues about how well they are learning. Self-efficacy is enhanced when students believe they are performing well and becoming more skillful. Lack of success or slow progress will not necessarily lower self-efficacy if students believe they can perform better by making adaptations (e.g., expending greater effort, using better learning strategies). In turn, self-efficacy enhances motivation, learning, self-regulation, and achievement (Schunk, 2012).

Experimental educational research supports the hypothesized relations shown in Figure 3.1 (Schunk, 2012; Schunk & Ertmer, 2000; Schunk & Usher, 2012). These studies have employed students in different grade levels (e.g., elementary, middle, high, postsecondary) and with diverse abilities (e.g., regular, remedial, gifted), and have investigated different content areas (e.g., reading, writing, mathematics, computer applications).

Some instructional and social processes that have been found to be beneficial for raising self-efficacy are having students pursue proximal and specific learning goals, exposing children to social models, providing students with performance and attributional feedback, teaching students to use learning strategies, having learners verbalize strategies while they apply them, making students' rewards contingent on their learning progress, and having students self-monitor and evaluate their progress (Schunk, 2012; Schunk & Ertmer, 2000). These processes differ in many ways, but they all inform students of their learning progress, which raises self-efficacy.

Predictive Utility

Several researchers have investigated the direct and indirect effects of self-efficacy on academic outcomes. Using path analysis, Schunk (1981) found that self-efficacy exerted a direct effect on children's achievement and persistence in mathematics. Pajares (1996a; Pajares & Kranzler, 1995) demonstrated that mathematics self-efficacy had as powerful a

direct effect on mathematics performance as did cognitive or mental ability. Self-efficacy also had an indirect effect on performance because self-efficacy mediated the influence of ability on performance. Pajares and Miller (1994) reported that mathematics self-efficacy was a better predictor of the mathematics performance of college undergraduates than were mathematics self-concept, perceived usefulness of mathematics, prior experience with mathematics, and gender, and that self-efficacy mediated the influence of gender and previous high school and college experience on subsequent performance.

Zimmerman and Bandura (1994) found that self-efficacy affected achievement directly as well as indirectly through its influence on goals (i.e., more efficacious students set more challenging goals). Schunk and Gunn (1986) found that children's long division achievement was directly influenced by use of effective strategies and self-efficacy. Relich, Debus, and Walker (1986) also found that self-efficacy exerted a direct effect on division achievement and that instructional treatment had both a direct and an indirect effect on achievement through self-efficacy.

SELF-EFFICACY FOR SELF-REGULATED LEARNING

Self-efficacy for self-regulated learning refers to self-efficacy to generate thoughts, feelings, and behaviors that are systematically oriented toward the attainment of learning goals (Zimmerman, 2000). Self-regulated learning involves students setting goals and pursuing goal-directed activities, such as by focusing on task demands, applying effective strategies to learn, establishing productive social and work environments, assessing learning progress, and making strategic adjustments as needed. A sense of self-efficacy for self-regulated learning motivates students and promotes their learning (Cleary & Zimmerman, 2012; Schunk & Usher, 2011).

Zimmerman (2000) developed a model of self-regulated learning that features the role of self-efficacy (see also Kitsantas & Cleary, this volume). This cyclical and recursive model comprises three phases: forethought, performance, and self-reflection. The *forethought* phase involves processes that students engage in prior to learning and includes motivational beliefs and task analysis. Key motivational beliefs are self-efficacy, outcome expectancies, intrinsic interest, and goal orientations (reasons why students want to learn). Task analysis includes goal setting (short- and long-term goals) and strategic planning, or deciding what methods to use.

The forethought phase initiates the learning activities that occur during the *performance* phase, during which students systematically and actively engage in learning. Key self-regulatory processes are self-control and self-observation. Students exert self-control by using strategies such as imagery, self-instruction, attention focusing, and others targeted at reaching goals (Zimmerman, 2000). Self-observation includes self-monitoring and self-recording learning progress. Students gain progress information from their perceptions and feedback from others (e.g., teachers, peers, parents). Students who feel self-efficacious for learning sustain their efforts and adapt their performances better than do those with lower self-efficacy (Schunk & Pajares, 2009).

Based on their self-monitoring and feedback from others, students form self-judgments and experience self-reactions in the *self-reflection* phase. Self-judgments include self-evaluations of learning progress and performance attributions (i.e., perceived causes of outcomes; Schunk, 2012). Self-evaluations are based on performance standards that may derive from their previous performances, performances by others (e.g., teachers), or absolute criteria. Causal attributions may reflect causes that students can control such as strategy use and effort or uncontrollable ones such as luck or ability (Graham &

Williams, 2009). Students also react to their performances with self-satisfaction and adaptive/defensive responses. Self-satisfaction refers to the level of contentment students feel about their performance relative to a standard or goal.

Adaptive/defensive responses include emotional reactions to performances. Students who react defensively exhibit apathy, helplessness, procrastination, and cognitive disengagement for future learning to preserve their self-worth (Garcia & Pintrich, 1994). Students who respond adaptively adjust their self-regulatory behaviors that may include modifying their motivational beliefs and task analyses.

Self-reflections return learners to the forethought phase, thus forming the recursive loop in the self-regulation cycle. Students who are self-efficacious about their self-regulatory capabilities are likely to persist even when they form negative evaluations (Schunk, 2012). These students may attribute their progress to strategy use and effort and adjust their plans for subsequent learning.

Researchers have explored the link between self-efficacy and the processes learners engage in to self-regulate. As students self-regulate their cognitions and behaviors, they can also regulate their self-efficacy—a key motivational variable (Wolters & Taylor, 2012). In the forethought phase, self-efficacy functions as a motivational belief; students who are self-efficacious set more ambitious goals and plan more-specific goal-directed strategies to accomplish these goals (Wigfield, Klauda, & Cambria, 2011). Self-efficacy has also been linked with a mastery goal (i.e., desire to learn) orientation (Zimmerman, 2011), task value and interest (McPherson & Renwick, 2011), and positive outcome expectations (Bandura, 1986). Students who have a strong sense of self-efficacy set higher goals for themselves, establish strategies to accomplish their goals, believe their attainment of the goals is valuable, and maintain their motivation over time (Schunk & Pajares, 2009).

Self-efficacy beliefs have also been found to influence performance phase measures such as monitoring one's performance, resisting distractions, and managing time (Bandura, 1997). In addition, research has demonstrated that self-efficacy beliefs predict cognitive and metacognitive strategy use (Pajares, 2008; Wolters & Pintrich, 1998). In the performance phase, students selectively make decisions about strategies that are most effective for the task. Students who are self-efficacious about their strategy use are able to adapt their strategies based on immediate feedback they receive as they monitor their performance while engaged in the task. Zimmerman and Kitsantas (1997) showed that learners who made adaptations and self-regulated were more self-efficacious than those who did not.

Self-efficacy affects students' processes in the self-reflection phase as well. Learners who are self-efficacious in their capability to self-regulate their learning have been found to attribute their performance to correctable causes, which may include making adaptations to future behavior such as putting in more effort or changing their strategies (McPherson & Renwick, 2011). Self-efficacious learners tend to respond to their dissatisfaction by making adaptive changes to future performance by modifying their strategic plans and goals (Cleary & Zimmerman, 2001), whereas those with low levels of self-efficacy are likely to respond defensively and attribute their performance to uncontrollable causes (e.g., low ability; Zimmerman, 2011).

FUTURE RESEARCH DIRECTIONS

Educational researchers have explored the operation of self-efficacy in diverse settings involving learning, motivation, and self-regulation, but many research challenges remain. In particular, we recommend research on learners from different cultural backgrounds,

contextual influences on self-efficacy, self-efficacy development in out-of-school settings, and the dynamic nature of self-efficacy.

Cultural Backgrounds

Most self-efficacy research studies have sampled from the school population of the United States. Although cross-cultural research is increasing, further investigations with students from different cultural backgrounds will expand our understanding of the operation and generality of self-efficacy. Klassen's (2004b) review of research studies revealed that self-efficacy tended to be lower for students from non-Western cultural groups (e.g., Asian and Asian-immigrant students) than for students from Western groups (e.g., Western Europe, Canada, United States). In general, the more-modest and less-overconfident self-efficacy beliefs of the non-Western students were more accurate and predicted academic outcomes better than did those of the Western students. It is possible that immigration status and political factors might moderate the relation of self-efficacy to outcomes.

Cultural variables also may affect the relations between social and academic self-efficacy beliefs and academic achievement (McInerney, 2008, 2011; Oettingen & Zosuls, 2006). Kim and Park (2006) contended that existing psychological and educational theories that emphasize individualistic values (e.g., ability, intrinsic interest, self-esteem, self-efficacy) cannot explain the high level of achievement of East Asian students. Instead, socialization practices that promote close parent-child relationships may be responsible for high levels of self-regulatory and relational self-efficacy. In these cultures, relational self-efficacy (i.e., the belief that students are capable in their familial and social relations), as well as social support received from parents, influences academic performances. In addition, the lower levels of self-efficacy found in some collectivist groups do not always translate into lower subsequent performance but instead reflect differing conceptualizations of self. Self-efficacy may be more other-oriented in some non-Western (particularly Asian) cultures than in Western cultures (Klassen, 2004a). Further research is called for among students from different cultural backgrounds.

Contextual Influences

Bandura's (1986) model of triadic reciprocality shows that self-efficacy—a personal factor—can be affected by environmental (contextual) factors. To determine how self-efficacy affects motivation, learning, achievement, and self-regulation in educational settings requires that we understand how contextual variables operate because self-efficacy depends on the context.

Important educational contextual influences arise from classrooms, schools, peers, families, and communities. For example, the transition from elementary to middle school brings about many changes in contextual variables, such as more impersonal teacher interactions, greater emphasis on normative grading, and greater diversity in peers among classes. Research is needed on how students combine the influence of these variables with that of their prior experiences in elementary school to arrive at self-efficacy judgments. For self-efficacy to predict achievement outcomes, we must be able to predict which factors will affect self-efficacy and how they might do so.

Another example involves student retention and dropout prevention (Finn & Zimmer, 2012; Rumberger, 2010, 2011; Rumberger & Rotermund, 2012). Undoubtedly many

factors contribute to dropout, including poor academic and social skills, lack of interest in school subjects, classrooms that stress competition and ability social comparisons, low perceived value of school learning, and little sense of belonging or relatedness to the school environment (Meece, Anderman, & Anderman, 2006; Wentzel, 2005). Students' involvement and participation in school depend in part on how much the school environment contributes to their perceptions of autonomy and relatedness (Deci & Ryan, 2012), which in turn can influence self-efficacy and achievement. Parents, teachers, and peers contribute to students' feelings of autonomy and relatedness, and the peer group exerts increasing influence during adolescence (Kindermann, 2007; Steinberg et al., 1996). This suggests that students who feel self-efficacious for learning but disconnected from the school environment may display low motivation and achievement. A challenge is to determine how self-efficacy intertwines with social influences to affect academic outcomes.

Out-of-School Settings

Research is needed on the development of self-efficacy outside of formal schooling settings. Most research on self-efficacy in education has been conducted in regular instructional settings using academic or related (e.g., physical education, music) content.

Examining self-efficacy in out-of-school settings is important because much learning takes place outside of formal instructional contexts, such as in after-school programs, homes, workplaces, and communities. Self-efficacy seems no less pertinent in these types of situations, but we know less about its operation outside of formal settings. Researchers might look, for example, at how self-efficacy develops as students complete homework, engage in internships, and participate in mentoring interactions.

Some important questions to be addressed are these: How well does self-efficacy theory apply to these settings? Does it need to be adapted due to different contextual influences? How do students learn and refine their skills and develop self-efficacy outside of formal instructional contexts? What roles do other persons in these environments, such as parents, peers, mentors, and coaches, play in helping students become self-efficacious learners?

Dynamic Nature

By definition, self-efficacy is a dynamic construct, meaning that it is continually susceptible to change. Learners' self-efficacy at the start of an instructional activity is likely to change as the activity proceeds. Yet in most self-efficacy studies, researchers assess it only at fixed points in time (e.g., pre- and post-test), meaning that they do not gain a full picture of its dynamic quality. Research is needed that captures this quality.

Most self-efficacy studies have assessed it using self-report measures, often collected before and/or after learning, but to assess its dynamic nature, other measures are needed. Some measures better suited to capture change during learning and which are used in research on self-regulated learning are think alouds, observations, traces, and microanalytic assessments.

Think alouds require learners to verbalize aloud their thinking while engaged in learning (Greene, Robertson, & Costa, 2011). Think alouds, which capture learners' verbalized cognitive processing, typically are recorded and transcribed. *Observations* of students while engaged in learning can occur through video and audio recording or by taking detailed notes (Perry, 1998). Observations are transcribed and coded to determine the

incidence of variables of interest. *Traces* are observable measures that students create as they engage in tasks (Winne & Perry, 2000). Traces are types of microanalytic assessments; they include marks students make in texts, but computer technologies have expanded the range of traces available because researchers are able to collect measures of learners' eye movements, time spent on various aspects of material to be learned, and selections of strategies to use with content. *Microanalytic assessments* examine learners' behaviors and cognitions in real time as they engage in tasks (DiBenedetto & Zimmerman, 2010). For these assessments, learners respond to context-specific questions concurrently as they engage in tasks.

These types of measures can detect moment-to-moment shifts in self-efficacy. A better understanding of the dynamic nature of self-efficacy gained through the use of such measures will inform theory and have implications for educational practice.

CONCLUSION

Self-efficacy research in education has made tremendous advances since Bandura's early writings. We know that self-efficacy is correlated with and influences academic motivation and learning in varied domains, and in turn is affected by numerous contextual variables. Research studies are needed that shed further light on the dynamic nature of self-efficacy in settings with diverse learners, as affected by contextual variables, and which extend beyond formal learning contexts. In turn, research knowledge on how to positively influence self-efficacy should be put to use in classrooms and schools, teacher preparation programs, and educational policies. We believe that self-efficacy researchers will continue to refine and apply self-efficacy theory productively in the years ahead.

REFERENCES

Aguayo, D., Herman, K., Ojeda, L., & Flores, L. Y. (2011). Culture predicts Mexican Americans' college self-efficacy and college performance. *Journal of Diversity in Higher Education, 4*, 79–89.

Aloe, A. M., Amo, L. C., & Shanahan, M. E. (2014). Classroom management self-efficacy and burnout: A multivariate meta-analysis. *Educational Psychology Review, 26*, 101–126.

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

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*, 191–215.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist, 28*, 117–148.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.

Bandura, A., Adams, N. E., & Beyer, J. (1977). Cognitive processes mediating behavioral change. *Journal of Personality and Social Psychology, 35*, 125–139.

Bong, M., & Skaalvik, E. M. (2003). Academic self-concept and self-efficacy: How different are they really? *Educational Psychology Review, 15*, 1–40.

Bouffard-Bouchard, T., Parent, S., & Larivee, S. (1991). Influence of self-efficacy on self-regulation and performance among junior and senior high-school age students. *International Journal of Behavioral Development, 14*, 153–164.

Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual Review of Psychology, 53*, 371–399.

Brunner, M., Keller, U., Dierendonck, C., Reichert, M., Ugen, S., Fischbach, A., & Martin, R. (2010). The structure of academic self-concepts revisited: The nested Marsh/Shavelson model. *Journal of Educational Psychology, 102*, 964–981.

Caprara, G. V., Barbaranelli, C., Borgogni, L., & Steca, P. (2003). Efficacy beliefs as determinants of teachers' job satisfaction. *Journal of Educational Psychology, 95*, 821–832.

Cattaneo, L. B., & Chapman, A. R. (2010). The process of empowerment: A model for use in research and practice. *American Psychologist, 65*, 646–659.

Chestnut, S. R., & Cullen, T. A. (2014). Effects of self-efficacy, emotional intelligence, and perceptions of future work environment on preservice teacher commitment. *The Teacher Educator, 49*, 116–132.

Cleary, T. J., & Zimmerman, B. J. (2001). Self-regulation differences during athletic practice by experts, non-experts, and novices. *Journal of Applied Sport Psychology, 13*, 61–82.

Cleary, T. J., & Zimmerman, B. J. (2012). A cyclical self-regulatory account of student engagement: Theoretical foundations and applications. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 237–257). New York, NY: Springer.

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.

Covington, M. V. (2009). Self-worth theory: Retrospection and prospects. In K. R. Wentzel & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 141–169). New York, NY: Routledge.

Dai, D. Y., & Rinn, A. N. (2008). The big-fish-little-pond effect: What do we know and where do we go from here? *Educational Psychology Review, 20*, 283–317.

Davis-Kean, P. E., Huesmann, L. R., Jager, J., Collins, W. A., Bates, J. E., & Lansford, J. E. (2008). Changes in the relation of self-efficacy beliefs and behaviors across development. *Child Development, 79*, 1257–1269.

Deci, E. L., & Ryan, R. M. (2012). Motivation, personality, and development within embedded social contexts: An overview of self-determination theory. In R. M. Ryan (Ed.), *The Oxford handbook of human motivation* (pp. 85–107). Oxford, England: Oxford University Press.

DiBenedetto, M. K., & Zimmerman, B. J. (2010). Differences in self-regulatory processes among students studying science: A microanalytic investigation. *Journal of Educational and Psychological Assessment, 5*(1), 2–24.

Dicke, T., Parker, P. D., Marsh, H. W., Kunter, M., Schmeck, A., & Leutner, D. (2014). Self-efficacy in classroom management, classroom disturbances, and emotional exhaustion: A moderated mediation analysis of teacher candidates. *Journal of Educational Psychology, 106*, 569–583,

Fast, L. A., Lewis, J. L., Bryant, M. J., Bocian, K. A., Cardullo, R. A., Rettig, M., & Hammond, K. A. (2010). Does math self-efficacy mediate the effect of the perceived classroom environment on standardized math test performance? *Journal of Educational Psychology, 102*, 729–740.

Finn, J. D., & Zimmer, K. S. (2012). Student engagement: What is it? Why does it matter? In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 97–131). New York, NY: Springer.

Friedel, J. M., Cortina, K. S., Turner, J. C., & Midgley, C. (2010). Changes in efficacy beliefs in mathematics across the transition to middle school: Examining the effects of perceived teacher and parent goal emphases. *Journal of Educational Psychology, 102*, 102–114.

Garcia, T., & Pintrich, P.R. (1994). Regulating motivation and cognition in the classroom: The role of self-schemas and self-regulatory strategies. In D.H. Schunk & B.J. Zimmerman (Eds.), *Self-regulation of learning and performance: Issues and educational applications* (pp. 127–153). Hillsdale, NJ: Erlbaum.

Goddard, R. D., Hoy, W. K., & Woolfolk Hoy, A. (2000). Collective teacher efficacy: Its meaning, measure, and impact on student achievement. *American Educational Research Journal, 37*, 479–507.

Graham, S., & Williams, C. (2009). An attributional approach to motivation in school. In K. R. Wentzel & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 11–33). New York, NY: Routledge.

Greene, J. A., Robertson, J., & Costa, L-J. C. (2011). Assessing self-regulated learning using think-aloud protocols. In B. J. Zimmerman & D. H. Schunk (Eds.), *Handbook of self-regulation of learning and performance* (pp. 313–328). New York, NY: Routledge.

Henson, R. K. (2002). From adolescent angst to adulthood: Substantive implications and measurement dilemmas in the development of teacher efficacy research. *Educational Psychologist, 37*, 127–150.

Holzberger, D., Philipp, A., & Kunter, M. (2013). How teachers' self-efficacy is related to instructional quality: A longitudinal analysis. *Journal of Educational Psychology, 105*, 774–786.

Joët, G., Usher, E. L., & Bressoux, P. (2011). Sources of self-efficacy: An investigation of elementary school students in France. *Journal of Educational Psychology, 103, 649–663.*

Kim, U., & Park, Y. S. (2006). Factors influencing academic achievement in collectivist societies: The role of self-, relational, and social efficacy. In F. Pajares & T. Urdan (Eds.), *Self-efficacy beliefs of adolescents* (pp. 267–286). Greenwich, CT: Information Age Publishing.

Kindermann, T. A. (2007). Effects of naturally existing peer groups on changes in academic engagement in a cohort of sixth graders. *Child Development, 78*, 1186–1203.

Klassen, R. M. (2004a). A cross-cultural investigation of the efficacy beliefs of south Asian immigrant and Anglo Canadian nonimmigrant early adolescents. *Journal of Educational Psychology, 96*, 731–742.

Klassen, R. M. (2004b). Optimism and realism: A review of self-efficacy from a cross-cultural perspective. *International Journal of Psychology, 39*, 205–230.

Klassen, R. M., & Chiu, M. M. (2010). Effects on teachers' self-efficacy and job satisfaction: Teacher gender, years of experience, and job stress. *Journal of Educational Psychology, 102*, 741–756.

Klassen, R. M., Tze, V. M. C., Betts, S. M., & Gordon, K. A. (2011). Teacher efficacy research 1998–2009: Signs of progress or unfulfilled promise? *Educational Psychology Review, 23*, 21–43.

Klassen, R. M., Usher, E. L., & Bong, M. (2010). Teachers' collective efficacy, job satisfaction, and job stress in cross-cultural context. *The Journal of Experimental Education, 78*, 464–486.

Lepper, M. R., Corpus, J. H., & Iyengar, S. S. (2005). Intrinsic and extrinsic motivational orientations in the classroom: Age differences and academic correlates. *Journal of Educational Psychology, 97*, 184–196.

Marsh, H. W., & Hau, K. (2003). The big-fish-little-pond effect on academic self-concept: A cross-cultural (26-country) test of the negative effects of academically selective schools. *American Psychologist, 58*, 364–376.

McInerney, D. M. (2008). The motivational role of cultural differences and cultural identify in self-regulated learning. In D. H. Schunk & B. J. Zimmerman (Eds.), *Motivation and self-regulated learning: Theory, research, and applications* (pp. 369–400). New York, NY: Taylor & Francis.

McInerney, D. M. (2011). Culture and self-regulation in educational contexts: Assessing the relationship of cultural group to self-regulation. In B. J. Zimmerman & D. H. Schunk (Eds.), *Handbook of self-regulation of learning and performance* (pp. 442–464). New York, NY: Routledge.

McPherson, G. E., & Renwick, J. M. (2011). Self-regulation and mastery of musical skills. In B. J. Zimmerman & D. H. Schunk (Eds.), *Handbook of self-regulation of learning and performance* (pp. 234–248). New York, NY: Routledge.

Meece, J. L., Anderman, E. M., & Anderman, L. H. (2006). Classroom goal structure, student motivation, and academic achievement. *Annual Review of Psychology, 57*, 487–503.

Moos, D. C., & Azevedo, R. (2009). Learning with computer-based learning environments: A literature review of computer self-efficacy. *Review of Educational Research, 79*, 576–600.

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.

Oettingen, G., & Zosuls, C. (2006). Self-efficacy of adolescents across culture. In F. Pajares & T. Urdan (Eds.), *Self-efficacy beliefs of adolescents* (pp. 245–266). Greenwich, CT: Information Age Publishing.

Pajares, F. (1996a). Role of self-efficacy beliefs in the mathematical problem-solving of gifted students. *Contemporary Educational Psychology, 21*, 325–344.

Pajares, F. (1996b). Self-efficacy beliefs in achievement settings. *Review of Educational Research, 66*, 543–578.

Pajares, F. (1997). Current directions in self-efficacy research. In M. Maehr & P. R. Pintrich (Eds.), *Advances in motivation and achievement* (Vol. 10, pp. 1–49). Greenwich, CT: JAI Press.

Pajares, F. (2006). Self-efficacy during childhood and adolescence: Implications for teachers and parents. In F. Pajares & T. Urdan (Eds.), *Self-efficacy beliefs of adolescents* (pp. 339–367). Greenwich, CT: Information Age Publishing.

Pajares, F. (2008). Motivational role of self-efficacy beliefs in self-regulated learning. In D. H. Schunk & B. J. Zimmerman (Eds.), *Motivation and self-regulated learning: Theory, research, and applications* (pp. 111–139). New York, NY: Taylor & Francis.

Pajares, F., & Kranzler, J. (1995). Self-efficacy beliefs and general mental ability in mathematical problem-solving. *Contemporary Educational Psychology, 20*, 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., & Schunk, D. H. (2001). Self-beliefs and school success: Self-efficacy, self-concept, and school achievement. In R. J. Riding & S. G. Rayner (Eds.), *Self-perception* (pp. 239–265). Westport, CT: Ablex.

Pajares, F., & Schunk, D. H. (2002). Self and self-belief in psychology and education: A historical perspective. In J. Aronson (Ed.), *Improving academic achievement: Impact of psychological factors on education* (pp. 3–21). San Diego, CA: Academic Press.

Patall, E. A. (2012). The motivational complexity of choosing: A review of theory and research. In R. M. Ryan (Ed.), *The Oxford handbook of human motivation* (pp. 248–279). Oxford, England: Oxford University Press.

Perry, N. E. (1998). Young children's self-regulated learning and contexts that support it. *Journal of Educational Psychology, 90*, 715–729.

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.

Pomerantz, E. M., Cheung, C. S., & Qin, L. (2012). Relatedness between children and parents: Implications for motivation. In R. M. Ryan (Ed.), *The Oxford handbook of human motivation* (pp. 335–349). Oxford, England: Oxford University Press.

Raftery, J. N., Grolnick, W. S., & Flamm, E. S. (2012). Families as facilitators of student engagement: Toward a home-school partnership model. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 343–364). New York, NY: Springer.

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.

Rumberger, R. W. (2010). *Dropping out of school*. Cambridge, MA: Harvard University Press.

Rumberger, R. W. (2011). *Dropping out: Why students quit school and what can be done about it*. Cambridge, MA: Harvard University Press.

Rumberger, R. W., & Rotermund, S. (2012). The relationship between engagement and high school dropout. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 491–513). New York, NY: Springer.

Ryan, R. M. (1993). Agency and organization: Intrinsic motivation, autonomy, and the self in psychological development. In J. E. Jacobs (Ed.), *Nebraska Symposium on Motivation 1992* (pp. 1–56). Lincoln, NE: University of Nebraska Press.

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. (2012). Social cognitive theory. In K. R. Harris, S. Graham, & T. Urdan (Eds.), *APA educational psychology handbook, Vol. 1: Theories, constructs, and critical issues* (pp. 101–123). Washington, DC: American Psychological Association.

Schunk, D. H., & DiBenedetto, M. K. (2014). Academic self-efficacy. In M. J. Furlong, R. Gilman, & E. S. Huebner (Eds.), *Handbook of positive psychology in schools* (pp. 115–130). New York, NY: Routledge.

Schunk, D. H., & Ertmer, P. A. (2000). Self-regulation and academic learning: Self-efficacy enhancing interventions. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 631–649). San Diego, CA: Academic Press.

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., & Meece, J. L. (2006). Self-efficacy development in adolescence. In F. Pajares & T. Urdan (Eds.), *Self-efficacy beliefs of adolescents* (pp. 71–96). Greenwich, CT: Information Age Publishing.

Schunk, D. H., & Pajares, F. (2009). Self-efficacy theory. In K. R. Wentzel & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 35–53). New York, NY: Routledge.

Schunk, D. H., & Usher, E. L. (2011). Assessing self-efficacy for self-regulated learning. In B. J. Zimmerman & D. H. Schunk (Eds.), *Handbook of self-regulation of learning and performance* (pp. 282–297). New York, NY: Routledge.

Schunk, D. H., & Usher, E. L. (2012). Social cognitive theory and motivation. In R. M. Ryan (Ed.), *The Oxford handbook of human motivation* (pp. 13–27). New York, NY: Oxford University Press.

Schunk, D. H., & Zimmerman, B. J. (2006). Competence and control beliefs: Distinguishing the means and ends. In P. A. Alexander & P. H. Winne (Eds.), *Handbook of educational psychology* (2nd ed., pp. 349–367). Mahwah, NJ: Erlbaum.

Seaton, M., Marsh, H. W., & Craven, R. G. (2010). Big-fish-little-pond effect: Generalizability and moderation—two sides of the same coin. *American Educational Research Journal, 47*, 390–433.

Shavelson, R., & Bolus, R. (1982). Self-concept: The interplay of theory and methods. *Journal of Educational Psychology, 74*, 3–17.

Skinner, E. A., Wellborn, J. G., & Connell, J. P. (1990). What it takes to do well in school and whether I've got it: A process model of perceived control and children's engagement and achievement in school. *Journal of Educational Psychology, 82*, 22–32.

Smith, R. E. (1989). Effects of coping skills training on generalized self-efficacy and locus of control. *Journal of Personality and Social Psychology, 56*, 228–233.

Stajkovic, A. D., & Luthans, F. (1998). Self-efficacy and work-related performances: A meta-analysis. *Psychological Bulletin, 124*, 240–261.

Steinberg, L., Brown, B. B., & Dornbusch, S. M. (1996). *Beyond the classroom: Why school reform has failed and what parents need to do*. New York, NY: Simon & Schuster.

Usher, E. L. (2009). Sources of middle school students' self-efficacy in mathematics: A qualitative investigation. *American Educational Research Journal, 46*, 275–314.

Usher, E. L., & Pajares, F. (2008). Sources of self-efficacy in school: Critical review of the literature and future directions. *Review of Educational Research, 78*, 751–796.

Wentzel, K. R. (2005). Peer relationships, motivation, and academic performance at school. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 279–296). New York, NY: Guilford Press.

Wentzel, K. R., Russell, S., & Baker, S. (2014). Peer relationships and positive adjustment at school. In M. J. Furlong, R. Gilman, & E. S. Huebner (Eds.), *Handbook of positive psychology in schools* (pp. 260–277). New York, NY: Routledge.

Wigfield, A., Cambria, J., & Eccles, J. S. (2012). Motivation in education. In R. M. Ryan (Ed.), *The Oxford handbook of human motivation* (pp. 463–478). Oxford, England: Oxford University Press.

Wigfield, A., & Eccles, J. S. (2002). The development of competence beliefs, expectancies for success, and achievement values from childhood through adolescence. In A. Wigfield & J. S. Eccles (Eds.), *Development of achievement motivation* (pp. 91–120). San Diego, CA: Academic Press.

Wigfield, A., Klauda, S. L., & Cambria, J. (2011). Influences on the development of academic self-regulatory processes. In B. J. Zimmerman & D. H. Schunk (Eds.), *Handbook of self-regulation of learning and performance* (pp. 33–48). New York, NY: Routledge.

Williams, T., & Williams, K. (2010). Self-efficacy and performance in mathematics: Reciprocal determinism in 33 nations. *Journal of Educational Psychology, 102*, 453–466.

Winne, P. H., & Perry, N. E. (2000). Measuring self-regulated learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 531–566). San Diego, CA: Academic Press.

Wolters, C. A., & Pintrich, P. R. (1998). Contextual differences in student motivation and self-regulated learning in mathematics, English, and social studies classrooms. *Instructional Science, 26*, 27–47.

Wolters, C. A., & Taylor, D. J. (2012). A self-regulated learning perspective on student engagement. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 635–651). New York, NY: Springer.

Woolfolk Hoy, A. E., Hoy, W. K., & Davis, H. A. (2009). Teachers' self-efficacy beliefs. In K. R. Wentzel & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 627–653). New York, NY: Routledge.

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13–39). San Diego, CA: Academic Press.

Zimmerman, B. J. (2011). Motivational sources and outcomes of self-regulated learning and performance. In B. J. Zimmerman & D. H. Schunk (Eds.), *Handbook of self-regulation of learning and performance* (pp. 49–64). New York, NY: Routledge.

Zimmerman, B. J., & Bandura, A. (1994). Impact of self-regulatory influences on writing course achievement. *American Educational Research Journal, 31*, 845–862.

Zimmerman, B. J., & Kitsantas, A. (1997). Developmental phases in self-regulation: Shifting from process goals to outcome goals. *Journal of Educational Psychology, 89*, 29–36.