Abstract: Self-efficacy is a popular construct among researchers interested in student learning and performance. It has been used successfully to explain and predict a variety of cognitive, affective, and behavioral outcomes in diverse academic settings. Evidence has accumulated that unanimously points to the functional advantage of having strong self-efficacy beliefs. While so much has been documented on this important construct during the past several decades, it is our judgment that the time has come to reflect on past research findings and revisit some of the unresolved issues that have held up further development in academic self-efficacy research. In this chapter, we summarize existing research on self-efficacy beliefs in academic settings and suggest directions for future research in this area. Specifically, we present a brief overview of self-efficacy theory, along with relevant empirical findings, paying particular attention to the development of self-efficacy beliefs and their relationships with academic outcomes and other motivation constructs. We then turn to unresolved issues in self-efficacy theory and research, such as the growth trajectories of self-efficacy beliefs across time and academic domains, the benefits of modeling, and cross-cultural issues.

Self-efficacy refers to an individual's subjective conviction in her or his capabilities to perform a specific task successfully to achieve a desired outcome (Bandura, 1977). The construct has been studied by many researchers in various domains, since its initial conception, due to its proposed significance in adaptive human functioning. Considerable evidence has indeed accumulated, which points to self-efficacy as a powerful socio-cognitive determinant of human motivation, behavior, and affect (Bandura, 1997). In particular, self-efficacy plays a critical role in academic contexts, predicting choice of activities and courses, interest, persistence, effort expenditure, use of learning strategies, self-regulation, and eventual achievement of students (Bandura & Schunk, 1981; Pajares, 1996, 1997; Schunk, 1995).

Research on self-efficacy in the education literature can be classified into several representative strands. The first research strand focuses on the...
development of self-efficacy beliefs (Usher, 2009), while the second examines the relationship between self-efficacy and other constructs such as motivation, strategy use, self-regulation, and achievement (Pajares, 1996, 1997). The third research strand comprises studies on the role of self-efficacy beliefs in students’ choice behaviors, especially college majors and career-related choices in the fields of mathematics and science (Hackett, 1995), which has been a more popular topic in counseling than in education. The fourth major strand represents research on teacher efficacy (Tschannen-Moran et al., 1998).

In this chapter, we focus on the first and second research strands, because those two are most relevant in understanding the function of self-efficacy in student learning and performance. We first present a brief overview of self-efficacy theory, followed by past research findings on the development of self-efficacy beliefs and their relationship with other constructs. We then turn to some of the unresolved issues, which, in our opinion, have held up further advancement in self-efficacy theory and research.

Research on Self-Efficacy: What We Already Know

A vast majority of published studies on self-efficacy have investigated the relationship of self-efficacy to motivation and performance. In this section, we discuss findings of previous studies in education. After a short introduction of self-efficacy theory, we discuss the development of self-efficacy beliefs, along with relevant findings from educational research. We then introduce further empirical findings on the relationship of self-efficacy beliefs with student learning, motivation, and self-regulation.

Brief Overview of Self-Efficacy Theory

Bandura’s (1986) social cognitive theory posits that human behavior is explained by reciprocal determinism or a model of triadic reciprocity, in which personal, behavioral, and environmental factors interact with each other as determinants of human behavior. As an agentic perspective forms the foundation of social cognitive theory (Bandura, 2001), self-efficacy is a pivotal component in these reciprocal relationships. Individuals appraise their self-efficacy to determine what actions to take, how much effort to invest, how long to persevere, and what strategies to use before performing a task, especially under taxing circumstances (Pajares & Schunk, 2001).

1 An agentic perspective refers to the view that people are self-organizing, proactive, self-reflective, and self-regulating toward their own development, adaptation, and change in given situations. In social cognitive theory, agentic perspective includes four core properties of human agency, namely intentionality, forethought, self-reactiveness, and self-reflectiveness.
Perceptions of self-efficacy differ from other perceptions of the self in many important respects. For example, self-concept and self-esteem, like self-efficacy, also represent subjective recognition of the self and its attributes, including competence. However, these two perceptions entail highly evaluative assessments of the recognized attributes and incorporate affective reactions toward the self, such as liking or disliking oneself. Judgments of self-efficacy can likewise result in emotional responses but, unlike self-concept or self-esteem, these emotions stay as separate constructs and do not comprise self-efficacy beliefs (Bong & Clark, 1999; Bong & Skaalvik, 2003). Table 3.1 summarizes these and other differences between academic self-concept and academic self-efficacy.

Although self-concept is less global than self-esteem and may be tied closely to each academic domain, neither perception is as specific as self-efficacy (Bong & Clark, 1999; Bong & Skaalvik, 2003). As can be seen in the sample assessment items presented in Table 3.2, self-concept also relies more heavily on one’s past performance history compared to self-efficacy, which necessarily makes the construct more stable and resistant to change, especially in the short run. Self-efficacy is relatively more malleable compared to self-concept or self-esteem, which renders itself a desirable target of instructional interventions. Self-efficacy is a competence-based construct and represents personal estimation of the confidence toward the task at hand (Pajares & Schunk, 2001; Schunk & Pajares, 2002). Because one needs to foretell the imminent performance situation to arrive at such judgment, it is best viewed as a predictive construct that goes beyond the appraisal of one’s past accomplishments (Bandura, 1997). Interested readers are referred to Bong and Skaalvik (2003) for a more detailed discussion of the similarities and differences between self-concept and self-efficacy.

Students with strong self-efficacy beliefs are likely to enjoy higher academic achievement, because they are more willing to approach challenging tasks (Pajares, 1996); exert more effort toward and persist longer at difficult tasks (Zimmerman, 2000); use self-regulated learning strategies more effectively (Zimmerman & Martinez-Pons, 1990); and experience lower levels of anxiety (Bandura, 1997) compared to those with weak self-efficacy beliefs. Self-efficacy is acquired and modified through four major sources of self-efficacy information (Bandura, 1977, 1997): mastery experience (e.g., enactive performance accomplishments; Joët et al., 2011); vicarious experience (e.g., modeling; Schunk & Hanson, 1985, 1989); social persuasion (e.g., encouragement; Usher & Pajares, 2009); and physiological states (e.g., feelings of anxiety; Usher & Pajares, 2008). Below we summarize the findings of previous studies on the development of self-efficacy beliefs.

**Development of Self-Efficacy Beliefs**

**Sources of self-efficacy information.** Bandura (1997) claimed that the major sources of information individuals use in forming their efficacy beliefs could
<table>
<thead>
<tr>
<th>Comparison dimension</th>
<th>Self-esteem</th>
<th>Self-concept</th>
<th>Self-efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Conceptual definition</strong></td>
<td>Evaluative judgments of oneself, which include one's feelings of and satisfaction toward oneself</td>
<td>Knowledge and perceptions about one's competencies and attributes, along with resultant emotional reactions</td>
<td>Subjective convictions for successfully executing a course of action to achieve a desired outcome</td>
</tr>
<tr>
<td><strong>Judgment specificity</strong></td>
<td>Global</td>
<td>Domain-specific</td>
<td>Domain- and context-specific</td>
</tr>
<tr>
<td><strong>Dominant reference point</strong></td>
<td>Past experiences</td>
<td>Past experiences</td>
<td>Future possibilities</td>
</tr>
<tr>
<td><strong>Temporal stability</strong></td>
<td>Stable</td>
<td>Stable</td>
<td>Malleable</td>
</tr>
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<table>
<thead>
<tr>
<th>Academic self-esteem</th>
<th>Academic self-concept</th>
<th>Academic self-efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Conceptual definition</strong></td>
<td>Evaluative judgments of oneself in achievement situations, which include one's feelings of and satisfaction toward oneself</td>
<td>Knowledge and perceptions about one's competencies and attributes in achievement situations, along with resultant emotional reactions</td>
</tr>
<tr>
<td><strong>Levels of formation</strong></td>
<td>Overall judgments formed at the global levels of functioning</td>
<td>Formed at the global as well as domain- and subject-specific levels</td>
</tr>
<tr>
<td><strong>Example constructs</strong></td>
<td>Academic self-esteem</td>
<td>Academic self-concept, English self-concept, mathematics self-concept, etc.</td>
</tr>
<tr>
<td><strong>Example statements</strong></td>
<td>I like myself in school</td>
<td>I have always done well in English</td>
</tr>
<tr>
<td></td>
<td>I am satisfied with the way I am at school</td>
<td>I am a good student in mathematics</td>
</tr>
<tr>
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</tbody>
</table>
be categorized into the following four types: mastery experience, vicarious experience, social persuasion, and physiological states.

**Mastery experience,** or one's past achievement, is the most prominent source of self-efficacy information (Usher & Pajares, 2008). Whereas past experiences that are successful and positive nourish and enrich one's self-efficacy beliefs (Britner & Pajares, 2006), those that are unsuccessful and negative weaken and lower these beliefs (Pajares, 2003). It is easier for failure experiences to dampen one's self-efficacy toward the task than for successful experiences to boost one's self-efficacy toward it (Bandura, 1997). What is most important in self-efficacy estimation, however, is not the success and failure in an objective sense but one's subjective recognition and interpretation of one's own prior experiences.

**Vicarious experience** is the next powerful source of self-efficacy information (Bandura, 1977), acquired through observing others. To obtain information

### Table 3.2 Examples of self-concept and self-efficacy items for predicting mathematics performance

<table>
<thead>
<tr>
<th>Self-concept items</th>
<th>Self-efficacy items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics is one of my best subjects</td>
<td>Solve equations containing square roots?</td>
</tr>
<tr>
<td>I often need help in mathematics*</td>
<td>Solve for ( x ) in quadratic equations?</td>
</tr>
<tr>
<td>I look forward to mathematics classes</td>
<td>Solve functions from given vertex and/or Cartesian coordinates?</td>
</tr>
<tr>
<td>I have trouble understanding anything with mathematics in it*</td>
<td>Compute the mean, standard deviation, and variance using a frequency table?</td>
</tr>
<tr>
<td>I enjoy studying for mathematics</td>
<td>Determine whether a given triangle is acute or obtuse using its three sides?</td>
</tr>
<tr>
<td>I do badly in tests of mathematics*</td>
<td>Compute the area of a figure with known perimeters?</td>
</tr>
<tr>
<td>I get good marks in mathematics</td>
<td>Solve for a particular angle of figures inscribed in a circle?</td>
</tr>
<tr>
<td>I never want to take another mathematics course*</td>
<td>Compute the area of a circle inscribed in a triangle with known sides?</td>
</tr>
<tr>
<td>I have always done well in mathematics</td>
<td>Compute the length of a line connecting a particular point on a circle and a tangent line?</td>
</tr>
<tr>
<td>I hate mathematics*</td>
<td>Solve equations containing cos, sin, tan, ( \cos^2 ), sin(^2), or ( \tan^2 )?</td>
</tr>
</tbody>
</table>

*Note. Self-concept items are from the Self-Description Questionnaire II (Marsh, 1999b). Self-efficacy items are from Bong (2002) for tenth grade mathematics in Korea. *Negatively worded items.
concerning their potential performance on a given task, especially when lacking direct mastery experience, students compare themselves to others in similar learning situations. Observing a model successfully performing a task raises the self-efficacy of observers toward the same task (Bandura, 1986, 1997) and influences their subsequent performance positively (Schunk & Hanson, 1985, 1989; Schunk et al., 1987). Competent models that demonstrate effective learning strategies for dealing with difficult tasks enhance the efficacy beliefs of the observing students, whereas incapable and unsuccessful models that display learning and performance difficulties weaken the self-efficacy beliefs of the observers toward the same or related tasks (Bandura, 1986, 1997; Schunk, 1987; Zeldin & Pajares, 2000).

Social persuasion, verbal and non-verbal reactions by others to one’s actual and potential performance, is another source of self-efficacy information. Positive feedback from significant others augments the efficacy beliefs of students (Zeldin & Pajares, 2000), while little or negative feedback undermines their efficacy beliefs (Bandura, 1997; Usher, 2009). Social persuasion is effective when delivered by powerful, competent, and credible social agents (Bandura, 1997).

Physiological states, such as sweating, nervousness, and heartbeat, are the last and presumably the weakest source of self-efficacy information (Bandura, 1977). The awareness that one feels anxious about performing any upcoming task lowers one’s self-efficacy toward the very task (Usher & Pajares, 2008).

Over the past several decades, a number of researchers have developed scales for measuring the four sources of self-efficacy information (e.g., Hampton, 1998; Lent et al., 1991; Matsui, et al., 1990), and they have tested the relationship between the sources so assessed and the resultant self-efficacy beliefs across a wide range of academic domains (Britner & Pajares, 2006; Joët et al., 2011; Lopez & Lent, 1992). A detailed review of the existing source scales can be found in Usher and Pajares (2008). Among the available efficacy source scales, the following three have been most widely used in educational research: the Mathematics Efficacy Information developed by Matsui et al. (1990); the Sources of Mathematics Self-Efficacy Scale developed by Lent et al. (1991); and the Sources of Middle School Mathematics Self-Efficacy Scale developed by Usher and Pajares (2009). Among these three, the Sources of Middle School Mathematics Self-Efficacy Scale is arguably the most psychometrically sound and feasible instrument, closely aligned with Bandura’s (1997) self-efficacy theory (Chen & Usher, 2013).

By adopting the aforementioned scales, investigators have found repeatedly that mastery experience is the most powerful predictor of student self-efficacy, which supports Bandura’s claim (Britner & Pajares, 2006; Joët et al., 2011; Lopez & Lent, 1992). Vicarious experience and social persuasion also predict self-efficacy positively, although the predictive utility of vicarious experience has not always been consistent (Lent et al., 1991; Matsui et al., 1990; Phan, 2012; Usher & Pajares, 2009). Social persuasion tends to demonstrate more
stable predictive power over student self-efficacy beliefs than vicarious experience does, a finding that deviates from theoretical prediction. The complexity associated with the assessment of vicarious experience is suspected to have prevented researchers from accurately capturing its influence on self-efficacy formation (Usher & Pajares, 2009). Physiological states are the negative predictor of student self-efficacy (Joët et al., 2011), whose relative predictive capacity often surpasses that expected by theory.

**Role of social agents.** A large body of research on the development of self-efficacy has verified the importance of social agents, especially in vicarious experience and social persuasion. As indicated earlier, effects of vicarious experience fluctuate considerably by the characteristics and types of models that demonstrate the target skill (Bandura, 1997; Schunk, 1987; Schunk & Hanson, 1985; Schunk et al., 1987). Effects of social persuasion are expected to vary likewise, depending on the perceived expertise, knowledgeableness, and credibility of the persuader (Bandura, 1997). However, empirical research to date has mainly centered on discovering the characteristics of models that make vicarious experience, rather than social persuasion, more influential on the formation of self-efficacy beliefs.

**Characteristics of models.** Modeling has proved effective in raising the efficacy beliefs of children in various school subjects, such as mathematics (Schunk & Hanson, 1985, 1989; Schunk et al., 1987), reading and writing (Braaksma et al., 2002; Couzijn, 1999; Schunk, 2003; Zimmerman & Kitsantas, 2002), as well as creative domains (Groenendijk et al., 2011). The effectiveness of this vicarious experience depends partly on the individual model involved.

For instance, Schunk and Hanson (1985, 1989) employed mastery and coping models in their series of classroom research, which demonstrated the targeted arithmetic skills to children lacking arithmetic competence. Mastery models demonstrated rapid and flawless performance of the skills. They also verbalized statements that reflected their positive attitudes (e.g., “I like doing these”), strong confidence (e.g., “I can do that one”), high perceived ability (e.g., “I’m good at this”), and low levels of task difficulty (e.g., “That looks easy”). In contrast, coping models initially performed the task with hesitation and occasional mistakes, verbalizing statements reflecting their negative attitudes (e.g., “That isn’t much fun”), weak confidence (e.g., “I’m not sure I can do that one”), low perceived ability (e.g., “I’m not very good at this”), and high levels of task difficulty (e.g., “That looks tough”). As time passed, however, they showed gradual improvement in performance and began to verbalize coping statements (e.g., “I’ll have to work hard on this one”), which resulted in successful performance. Coping models were significantly more beneficial than mastery models for the participating children, who had previously experienced learning difficulties in mathematics.

A recent study by Groenendijk et al. (2011) has further shown that the superiority of coping models to mastery models is not confined to academic
domains or students at particular performance levels. When videotaped modeling of mastery and coping performance in visual (collage) and verbal arts (poetry writing) were presented, students who observed coping models in visual arts reported stronger self-efficacy and more creative performance than those who observed mastery models. Similar effects were not obtained in poetry writing.

The perceived similarity of the model to the observer is an important source of information to formulate efficacy perceptions (Schunk et al., 1987). In general, children judge themselves to be more similar to a coping model than to a mastery model, which explains the stronger influence of coping models on their self-efficacy formation and performance. Children also exhibit stronger efficacy beliefs and performance after watching a peer model than a teacher model (Schunk & Hanson, 1985), presumably because of the greater degree of perceived similarity in competence to the same-aged peer than to the adult teacher. Presenting multiple models is more effective than presenting a single model for improving observers’ self-efficacy for the same reason; it increases the probability that observers find a model they perceive to be similar to themselves (Schunk, 2012).

Types of social agents. Although the relationship between self-efficacy and its four principal sources of information is rather firmly established, there have been inconsistent findings nonetheless. Specifically, vicarious experience and social persuasion theorized by Bandura (1977, 1997) have proved less effective or reliable as predictors of self-efficacy, particularly when they are assessed along with mastery experience or physiological states. Some researchers found that both were significant predictors of self-efficacy (Matsui et al., 1990; Usher & Pajares, 2006), whereas others reported no such effect (Britner & Pajares, 2006; Joët et al., 2011; Lopez & Lent, 1992). Often, social persuasion predicted self-efficacy better than vicarious experience did (Lent et al., 1991; Matsui et al., 1990; Phan, 2012; Usher & Pajares, 2009).

It is interesting to note that this inconsistency may be attributed to the lack of distinction between social agents, such as parents, teachers, and peers, in the existing vicarious experience and social persuasion scales. Self-efficacy development is sensitive to life-stage transitions, which induce changes in personal and social relationships (Schunk & Meece, 2006; Schunk & Pajares, 2002). Previous research suggests that the impact of social models on the sources of efficacy information varies depending on the students’ developmental stage and the perceived competence of the person modeling the performance (Schunk, 1987; Schunk & Pajares, 2002). Compared to younger children, adolescents are more prone to evaluate the similarities of their peers to themselves and adopt feedback from those peers when estimating their efficacy beliefs (Schunk & Miller, 2002; Usher, 2009; Wigfield & Wagner, 2005).

Not only does vicarious experience function differently depending on the social model, social persuasion may also differ in its effectiveness by the social model that delivers efficacy-relevant messages. Ahn, Bong and Kim (2017) tested this possibility by developing new vicarious experience and social
persuasion scales. These scales assess the vicarious experience and social persuasion from family members, teachers, and peers separately. The new vicarious experience scale thus contains three subscales: vicarious experience from family members, vicarious experience from teachers, and vicarious experience from peers. The new social persuasion scale contains three subscales as well: social persuasion by family members, social persuasion by teachers, and social persuasion by peers. Korean high school and college students responded to these items in reference to mathematics (e.g., “I have a family member who is really good at math”) and English as a foreign language (e.g., “When I am struggling with English, my teacher tells me that I can do well”).

Exploratory and confirmatory factor analysis revealed that Korean high school and college students alike clearly distinguished between the efficacy sources conveyed by different social agents in both mathematics and English. Multitrait-multimethod analysis also confirmed the necessity of distinguishing between efficacy sources as well as between social models. In addition to mastery experience and physiological states, social persuasion by teachers, but not vicarious experience from teachers or social persuasion by family members and peers, predicted student self-efficacy in mathematics; vicarious experience from teachers, but not social persuasion by teachers or vicarious experience from family members and peers, predicted student self-efficacy in English. These results further justify the need for independent assessment of the self-efficacy sources by the social model.

**Relationships of Self-Efficacy Beliefs to Other Constructs**

**Relationships to academic achievement.** A wealth of literature has substantiated that self-efficacy is a powerful predictor of academic behaviors (Bandura, 1997; Schunk, 1995). Numerous studies have documented the strong positive relationship between self-efficacy and academic achievement across grade levels (Alivernini & Lucidi, 2011; Joët et al., 2011; Zimmerman et al., 1992). A meta-analysis conducted by Multon, Brown, and Lent (1991) has shown that self-efficacy is positively related to both academic persistence and achievement. The effect was stronger for high school and college students than for elementary school students. The positive tie between academic self-efficacy and achievement was replicated in another meta-analysis (Honicke & Broadbent, 2016). Researchers generally agree that, among diverse self-beliefs and motivation constructs, self-efficacy is by far the strongest predictor of academic performance (Bong & Clark, 1999; Bong & Skaalvik, 2003).

**Relationships to learning and self-regulation.** Self-efficacy also influences self-regulatory processes such as goal setting, self-monitoring, self-evaluation, and strategy use (Zimmerman, 2000; Zimmerman & Cleary, 2006). Students with strong self-efficacy are more likely to engage in challenging tasks, set more difficult goals, demonstrate more efficient use of self-regulatory strategies, and persist longer than are those with weak self-efficacy. Zimmerman et al.
(1992) demonstrated that self-efficacy for self-regulated learning reported by students predicted their self-efficacy for academic achievement, which in turn predicted their final grades. Students’ self-efficacy for academic achievement predicted students’ final grades directly as well as indirectly via students’ grade goals. Pintrich and De Groot (1990) also reported that students with high self-efficacy were more likely to use cognitive and self-regulatory strategies compared to students with low self-efficacy.

A sense of self-efficacy is enhanced when students set proximal goals. Bandura and Schunk (1981) randomly assigned students into the proximal-goal (to complete six pages of the problem set during each of the seven sessions in the remedial instructional program), distal-goal (to complete all 42 pages of the problem set by the end of the entire program), no-goal (to complete simply as many pages as possible during the program), and no-treatment conditions. All students, except for those in the no-treatment condition, learned how to solve subtraction problems using self-instructional materials. Self-efficacy and skill development in subtraction, assessed at the end of the program, were significantly higher among the students who had worked with proximal goals than among those in any other condition, including the students who had worked with distal goals.

Zimmerman and Kitsantas (1997) provided additional evidence detailing the effects of goal setting and self-monitoring on self-efficacy and skill development. In their experiment, high school girls were asked to participate in a study of dart-throwing and were subsequently provided with demonstration, instructions, and practice time for dart-throwing skills in one of nine conditions. Eight experimental conditions were created by different combinations of outcome and process goals, with or without self-recording; a practice-only control group involved neither goal setting nor self-recording. The results showed that students in the shifting-goal condition with self-recording ended up with the highest dart-throwing skill, strongest self-efficacy beliefs, most positive self-reactions, and greatest interest in the dart-throwing game. In contrast, students in the outcome-goal condition without self-recording displayed the lowest levels of skills, self-efficacy, self-reactions, and interest in dart throwing. The students in the shifting-goal condition started their dart-throwing practice with a process goal of following the correct steps for the throw but, once their throwing skills had become automatized, shifted to an outcome goal of hitting the bull’s-eye on the target.

These experiments demonstrate the advantage of short-term process goals for augmenting student self-efficacy and skill development, especially during the initial stage of learning. The specific and proximal nature of these goals is conducive to effective self-monitoring, because they offer students clear standards and opportunities to evaluate their progress toward the goals. After students become proficient and reasonably confident with the execution of target skills, their self-efficacy and performance can be further enhanced by pursuing specific outcome goals.
More recently, Lee, et al. (2014) compared the relative function of self-efficacy and interest in the self-regulatory pathway, leading to achievement in the subject domain. Self-efficacy predicted the grade goal that students set for the subject, which predicted their achievement in the domain directly and indirectly via their self-regulatory strategy use. Self-efficacy of the students also predicted their achievement directly. In contrast, interest linked to achievement only through students’ use of self-regulatory strategies was not able to predict achievement directly. The same pattern was obtained repeatedly in four different subject areas that included Korean, English, mathematics, and science, lending credibility to the finding. The authors suggested that there might be two pathways to successful self-regulation and that self-efficacy beliefs constituted the most crucial component in the cognitive pathway to academic self-regulation and achievement.

Relationships to academic motivation. Finally, research on self-efficacy demonstrates significant relationships of self-efficacy to a variety of motivation constructs. Self-efficacy typically covaries positively with adaptive variables, such as task value, interest, and mastery achievement goals, and negatively with maladaptive variables, such as anxiety. Below we introduce relevant empirical findings on the relationship of self-efficacy with each of these motivation constructs.

Self-efficacy and task value. Expectancy for success and task value are important predictors of students’ academic choice and performance behaviors in expectancy-value theory (Wigfield & Eccles, 2000). Expectancy for success refers to the subjectively estimated probability of success on a given task, which is considered conceptually similar to self-efficacy. Task value refers to an incentive for engaging in the task and consists of attainment value (i.e., perceived importance of doing well on the task for one’s self-concept), intrinsic value (i.e., perceived interest in and enjoyment while performing the task), and utility value (i.e., perceived usefulness of doing well on the task; Eccles & Wigfield, 2002). Many studies have attested to the positive relationship between self-efficacy and task value in various academic domains.

Wolters et al. (1996), for instance, present evidence for a positive correlation between self-efficacy and task value across mathematics, English, and social studies. Seventh and eighth graders at a junior high school participated in the survey at the beginning and end of the school year. The self-efficacy beliefs of the students correlated positively with their task value perceptions in all three academic subjects at both time points. Corroborating evidence for the efficacy-value link was provided in a study by Bong (2001). Self-efficacy beliefs of both Korean middle and high school students correlated positively with their task value in Korean, English, mathematics, and science. Findings from these two studies affirm the robust association between self-efficacy and task value across multiple subject areas and grade levels that is unaffected by the characteristics of specific subjects or the time of assessments. Students who expressed strong confidence for performing well in a
given school subject also tend to believe that the subject is important, interesting, and useful.

Whereas beliefs of self-efficacy and task value typically maintain positive relationships, an inside look at their connections reveals relationships that are not always as simple or straightforward. Lee et al. (2013) reasoned that when students are faced with abundant social comparative cues, fierce competition, and high-stakes testing in their learning environment, perceptions of high task value unsupported by strong self-efficacy can be a source of self-worth threat for them. Empirical results showed that this was indeed the case. The researchers analyzed the survey responses of almost 7,000 Korean middle school students, collected when they were eighth (T1) and ninth graders (T2), on their perceptions of self-efficacy and task value toward English and mathematics, as well as their use of self-handicapping strategies and test stress in these two subjects. Significant interactions emerged between T1 task value and self-efficacy on T2 self-handicapping and test stress. Students with strong self-efficacy engaged in less self-handicapping as they perceived greater intrinsic value and utility value in the subject; those with weak self-efficacy, however, reported greater self-handicapping as they perceived greater task value. Similarly, all students experienced greater test stress as they perceived greater task value in the subjects; however, this tendency was significantly stronger among students with weak self-efficacy than among those with strong self-efficacy.

Lee et al. (2014) replicated this pattern with another group of Korean high school students. Beliefs of self-efficacy in English again interacted significantly with the task value perceptions students held toward English. Highly self-efficacious students reported less cheating and less academic procrastination as they perceived greater task value in English; students lacking self-efficacy, on the contrary, displayed stronger tendency to cheat and procrastinate in English as their perceptions of task value in English became stronger.

**Self-efficacy and interest.** Alternatively, some researchers focus more specifically on the relationship of self-efficacy to interest. Bandura and Schunk’s (1981) study is one of the earliest works that investigated the connection between self-efficacy, proximal goals, and interest. They hypothesized that proximal goals would serve as an important tool in the development of competencies, self-efficacy, and interest. Students who displayed weak competence and low interest in arithmetic computations were randomly assigned to the proximal-goal, distal-goal, no-goal, and no-treatment conditions and attended remedial classes with self-instructional materials. At the end of the program, children in the proximal-goal condition made the most substantial improvements in arithmetic skills and self-efficacy, as well as interest toward the arithmetic activities. This result is consistent with the co-development in skills, self-efficacy, and interest in dart throwing reported by Zimmerman and Kitsantas (1997), described earlier.

The observations of Bandura and Schunk (1981) as well as Zimmerman and Kitsantas (1997) suggest that learners may need to feel reasonably competent
before finding the activity to be interesting. Bong et al. (2015) tested this possibility. In Study 1, the cross-sectional association between self-efficacy and interest in three subject areas was examined among Korean middle and high school students. They observed that the self-efficacy and interest correlated significantly more strongly in mathematics and science than in language arts. In Study 2, the longitudinal association between self-efficacy and interest was explored in mathematics among a nationally representative sample of Korean middle school students. The two constructs displayed significant reciprocal relationships across the four assessment points, spanning the three middle school years and one high school year. Contrary to the authors’ hypothesis, student interest in mathematics during the previous year was a stronger predictor of student self-efficacy in mathematics in the subsequent year than student self-efficacy was of student interest. These results suggest that interest may be an important prerequisite for developing self-efficacy beliefs, especially in science and mathematics.

Niemivirta and Tapola’s (2007) study with students in Finland provides additional insight into the relationship between self-efficacy and interest. The researchers examined how changes in self-efficacy and changes in interest related to each other, and whether these changes independently predicted overall performance on dynamic problem-solving tasks. There was a significant positive correlation between the initial self-efficacy scores and the initial interest scores, as well as between the changes in self-efficacy scores and those in interest scores (i.e., slopes). Not only self-efficacy beliefs during the beginning phase of the task correlated with interest, but also subsequent increases in self-efficacy beliefs correlated with similar increases in interest. Taken together, these studies illustrate the strong tie and co-development of self-efficacy and interest, corroborating the finding of meta-analysis (Rottinghaus et al., 2003).

**Self-efficacy and achievement goals.** Another motivational variable that has received fairly extensive attention in self-efficacy research is achievement goals. Achievement goals represent the reasons for engaging in achievement-oriented pursuits that most typically include a mastery goal and a performance goal, with the latter separated into a performance-approach goal and a performance-avoidance goal. Students with mastery goals strive for self-improvement and task mastery, whereas those with performance goals are most concerned with validating their competence, either by demonstrating their superior competence (i.e., performance-approach goal) or by concealing their relative incompetence (i.e., performance-avoidance goal) compared to others (Elliot, 1999; Elliot & Church, 1997). Self-efficacy correlates positively with mastery and performance-approach goals and negatively with performance-avoidance goals across academic domains (Bong, 2001).

Pajares et al. (2000) sought to explain the relationship between achievement goals and self-efficacy in writing and science. Self-efficacy beliefs of the middle school students in both writing and science correlated
positively with their mastery goals and negatively with their performance-avoidance goals. Moreover, self-efficacy was predicted independently by achievement goals. Specifically, self-efficacy was predicted positively by mastery goals in both writing and science. Writing self-efficacy was also predicted positively by performance-approach goals but negatively by performance-avoidance goals.

Not surprisingly, the firm linkage between self-efficacy and achievement goals was replicated in a study of Korean adolescents by Noh et al. (2011). Analyzing a longitudinal database across three waves, the investigators found a significant reciprocal association between self-efficacy and achievement goals across time. Prior self-efficacy predicted later mastery goals positively and later performance-avoidance goals negatively; mastery goals in turn predicted subsequent self-efficacy positively, while performance-avoidance goals did so negatively. Whereas self-efficacy during the first wave positively predicted performance-approach goals during the second wave, the path disappeared during the third wave. Performance-approach goals predicted subsequent self-efficacy in none of the waves, hinting at the stronger role efficacy beliefs play in performance-approach goal adoption than vice versa.

**Self-efficacy and anxiety.** Self-efficacy often determines the emotional state of individuals in achievement situations (Bandura, 1997). In particular, a vicious cycle operates between self-efficacy and anxiety. Nervousness before performing a task lowers one's self-efficacy toward the impending task, and the weakened sense of self-efficacy intensifies the worries and negative affect while one performs the task, further lowering the efficacy toward it. The strong negative association between judgments of self-efficacy and anxiety has been observed repeatedly in educational research (e.g., Bong et al., 2012; Wolters et al., 1996).

**Cross-Cultural Differences in the Relative Utility of Self-Efficacy Information**

Self-efficacy has proven its significance as an important determinant of motivation and performance across a multitude of countries and cultures (Bandura, 2002). Despite this cross-cultural generality in the functional value of self-efficacy, some have nevertheless suspected culture-related differences in the formation of self-efficacy beliefs. Oettingen (1995) asserts, “culture may affect not only the type of information provided by the various sources, but also which information is selected and how it is weighted and integrated in people's self-efficacy judgments” (p. 151). She has presented three possibilities as a basis of her claim: (1) individuals in different cultures may experience different degrees of exposure to certain sources of self-efficacy information; (2) communication of efficacy-relevant information can take different forms across cultures; and (3) the extent to which each self-efficacy information source is deemed valuable varies across cultures.
Self-efficacy researchers have acknowledged the potential role of culture in the development and operation of self-efficacy beliefs. Bandura (2002) stated, “Although efficacy beliefs have generalized functional value, how they are developed and structured, the ways in which they are exercised, and the purposes to which they are put vary cross-culturally” (p. 273). Likewise, Pajares (2007) called for “culturally attentive” research to understand different cultural practices for cultivating academic self-efficacy beliefs of students.

Answering this call, a number of researchers have investigated differences in the strength of self-efficacy beliefs, as well as in the relationship between efficacy sources and resultant self-efficacy judgments, across countries and ethnic groups. After reviewing studies of self-efficacy that contain cultural components, Klassen (2004b) concluded that individuals from collectivistic cultures tend to rate their self-efficacy lower than do those from individualistic cultures. He observed that these modest self-efficacy beliefs of collectivists nonetheless demonstrate predictive utility that is comparable or superior to that associated with the self-efficacy beliefs of individualists. The findings of Stigler et al. (1985) are consistent with this observation. Taiwanese fifth graders rated their general self-worth, as well as their perceived competence in the cognitive and physical domains, significantly lower in comparison to the ratings US children had provided on the same scale in previous studies. However, perceived competence of the Taiwanese children in the cognitive domain was still a significant predictor of their reading, mathematics, social studies, and average grades, to the degree commensurate to that witnessed in the US samples.

Klassen (2004a) provided further evidence that individualism and collectivism could make a difference in the relative weight students assign to each source of self-efficacy information. For collectivistic Indo-Canadian seventh graders, both self-oriented (i.e., mastery experience and physiological states) and other-oriented (i.e., vicarious experience and social persuasion) sources of efficacy information were significant antecedents of their academic self-efficacy in mathematics. For individualistic Anglo-Canadian students, in contrast, only the two self-oriented sources were significant predictors of their mathematics self-efficacy. This study shows that students of individualistic and collectivistic heritage place different weights on the sources of self-efficacy information when gauging their self-efficacy in the domain.

In a more recent study, Ahn et al. (2016) compared the predictive utility of other-oriented sources of self-efficacy information from multiple social agents in the formation of mathematics self-efficacy beliefs of adolescents in Korea, the Philippines, and the United States. Both vicarious experience and social persuasion exhibited prediction power that differed not only by the social agents but also by the cultural backgrounds of the adolescents. Mathematics self-efficacy beliefs of the American and Korean students were predicted equally by the vicarious experience from their teachers and the social persuasion by their family members and peers, whereas those of the Filipino students were best predicted by the social persuasion by their peers.
Future Research Directions: What We Need to Know Further

In this final section of the chapter, we suggest directions for future research on academic self-efficacy based on the gaps we identified in contemporary literature. It is our assessment that research on the following topics is currently lacking and appears particularly promising for making contributions to the field, once conducted. Specifically, future research is recommended on the growth trajectories of self-efficacy beliefs, the benefits of modeling, and cross-cultural issues.

Growth Trajectories of Self-Efficacy Beliefs across Contexts and Time

Many researchers have invested a lot of effort into uncovering the relationship of self-efficacy to its antecedents and consequences. Interestingly, a considerable majority of the extant literature involves the domain of mathematics. The heavy focus on the role of self-efficacy in mathematics learning and performance may be attributable to the inherent nature of the domain. Pajares and Miller (1994) stated, “the solving of math problems afforded a clearer and more reliable assessment than was possible in other academic contexts” (p. 200).

However, Butz and Usher (2015) pointed out that the strength of the source-to-efficacy connection can fluctuate, depending on the individual or contextual factors. Obviously, contextual differences in self-efficacy beliefs are not limited to their associations with their antecedents. Nevertheless, relationships of efficacy perceptions with their information sources are suspected to swing more than their relationships with other constructs such as academic motivation and performance. For instance, the same mastery experience may strengthen student self-efficacy better in learning environments where task mastery and individual progress are appreciated than in learning environments where test performance and relative superiority receive the greatest rewards and recognition. In fact, that was exactly what Ahn et al. (2013) observed. In their study, the mastery experience of the participating students interacted significantly with their perceptions of the classroom goal structure such that the same mastery experience augmented students’ self-efficacy beliefs significantly more strongly in mastery-oriented classrooms than in performance-oriented ones. The effect of self-efficacy on motivation and achievement may likewise differ depending on the context or the academic domain.

A clear need also exists for more investigations on the relationship between self-efficacy and academic motivation over time. Bong (2005) observed an interesting pattern when she repeatedly assessed Korean students’ self-efficacy and achievement goals in Korean, English, mathematics, and general school learning over an academic year: once before a midterm examination and once after a final examination during both the first and second semesters. Beliefs of self-efficacy increased from the beginning to the end of the first semester in all four contexts but, when assessed again before the midterm during the
second semester, dropped to a level equivalent to that in the beginning of the first semester. By the end of the second semester, the weakened self-efficacy recovered to a level similar to that at the end of the first semester. In addition, self-efficacy predicted mastery goals positively and performance-avoidance goals negatively, but these predictive paths emerged largely during the second semester and seldom during the first semester.

The findings of Bong (2005) hint at two possibilities: (1) increases in self-efficacy beliefs generally take a linear form, especially in the long run, but vary considerably around major achievement events such as midterm and final examinations; and (2) it may be necessary for students to grasp the characteristics of the school subjects or the learning environments before their self-efficacy beliefs start shaping their motivation and performance. More longitudinal studies can address how the growth trajectories and predictive relationships of self-efficacy differ across contexts, domains, and time.

**Benefits of Modeling**

Schunk et al. have generated many findings on modeling that have strong implications for classroom instruction (e.g., Schunk & Hanson, 1985, 1989; Schunk et al., 1987). Still, there are areas in which further research can prove useful. One such area is the model similarity hypothesis that explains the unequal impact of modeling on self-efficacy development. Up to date, perceived model-observer similarity in competence is assumed to underlie the stronger relationship between coping models and student self-efficacy compared to that between mastery models and self-efficacy beliefs. We need to learn whether this effect of similarity is largely restricted to competence or entails other model characteristics as well.

The type of modeling may also interact with observer characteristics. In a study by Braaksma et al. (2002), eighth graders were randomly assigned to the weak-model, good-model, and control conditions. Students assigned to the two modeling conditions watched videos of coping and mastery peer-model pairs performing argumentative writing tasks. Students in the weak-model condition were asked to focus on the coping model’s performance, while those in the good-model condition focused on the mastery model’s performance. Low-ability participants learned more after observing coping models, whereas high-ability participants learned more after observing mastery models. Though the researchers did not assess students’ perceptions of model similarity, it seems probable that low-ability students found coping models more similar to themselves, as high-ability students did mastery models.

Adoption of new technologies could help researchers pursue this line of research on effective modeling. Levels of proficiency displayed by models and degrees of similarity of models to observers in age, gender, appearance, and other traits can be manipulated easily in videos and computer programs. Performance features that can inform instructional decisions, such as the
degree of coping or the time taken to eventual task mastery, are also much easier to exemplify in varying degrees in technological environments than in live modeling. This type of inquiry would produce results that can help optimize the effects of instructional modeling on students’ self-efficacy beliefs.

**Cross-Cultural Issues**

Despite the promising early findings, a great deal more work is required to clarify how the diverse sources of self-efficacy information are selected, interpreted, and integrated differently because of different cultural practices. As described earlier, recent studies found some evidence of cultural diversity in the relative use of self-efficacy information sources (Ahn et al., 2016; Klassen, 2004a). These studies, although enlightening, illustrate cultural differences at a very broad level and fall short of detailing the mechanism responsible for the observed differences. We are left to wonder whether the difference between individualistic and collectivistic cultures (Klassen, 2004a, 2004b) or that between adolescent learners in Korea, the Philippines, and the United States (Ahn et al., 2016) in the degree each self-efficacy source is consulted is truly due to cultural norms and, if so, whether these norms apply equally to various subject domains, phases of learning, and groups of students at different developmental stages.

Often, cultural differences are closely intertwined with differences in educational systems and policies. It will be informative to disentangle differences due mainly to cultural practices from those due to systems, so as not to make an erroneous conclusion regarding the cultural features in self-efficacy development. If we understand why students from certain cultural backgrounds are drawn more to one efficacy source or the other, we will be in a better position to devise practical strategies to help improve the self-efficacy beliefs of more learners in need.

**Concluding Thoughts**

Self-efficacy is a popular construct among educational researchers, because it explains and predicts a variety of cognitive, affective, and behavioral outcomes in diverse learning situations. In achievement contexts, it represents the subjective confidence of students to learn and perform given academic tasks successfully to a desired level (Schunk, 1991). Abundant evidence has accumulated during the past several decades that unanimously points to the functional advantage of having strong self-efficacy beliefs in academic settings. We have traced the evolution of self-efficacy research within the domain of education, focusing on the development of self-efficacy beliefs and their relationships with other constructs.

Self-efficacy beliefs are cultivated through acquiring relevant information from four major sources, namely mastery experience, vicarious experience,
social persuasion, and physiological states (Bandura, 1997). Academic self-efficacy so constructed is a powerful predictor of students’ academic achievement (Schunk, 1995) as well as students’ self-regulatory processes and outcomes (Zimmerman, 2000; Zimmerman & Cleary, 2006). The sense of self-efficacy of learners in any academic domain correlates positively with their task value (Bong, 2001), interest (Bong et al., 2015), and mastery achievement goals in the same domain (Bong, 2005; Noh et al., 2011).

We have recounted these and other important findings from previous research and offered directions for future investigations on academic self-efficacy. Although many investigators have already studied, and continue to study, the sources and consequences of self-efficacy beliefs, several vexing problems remain. The growth trajectories of self-efficacy beliefs across contexts, domains, and time; the benefits of modeling; and the relative utility of self-efficacy sources, as well as the relative power of self-efficacy beliefs as determinants of student learning, motivation, and performance across cultures, are the topics that require urgent attention, in our view. We hope this chapter provides some useful information and guidelines for researchers and educators interested in self-efficacy theory and research.

References


