CHAPTER 2

ADOLESCENTS' DEVELOPMENT OF PERSONAL AGENCY

The Role of Self-Efficacy Beliefs and Self-Regulatory Skill

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Adolescence is often a stressful period during development because it involves a pivotal transition from childhood dependency to adulthood independence and self-sufficiency (Smith, Cowie, & Blades, 1998). One major challenge that adolescents encounter during their teenage years involves acquiring a sense of personal agency in what often seems to be a recalcitrant world. Personal agency refers to one's capability to originate and direct actions for given purposes. It is influenced by the belief in one's effectiveness in performing specific tasks, which is termed *self-efficacy*, as well as by one's actual skill. In this chapter, we trace the development of personal agency during adolescence as well as the defining and distinctive features of adolescent students' self-efficacy beliefs. We then contrast self-efficacy with alternative self-related con-

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structs, and we examine its causal role in adolescents' motivation, achievement, and academic development. Finally, we describe the interdependence of adolescents' academic self-efficacy beliefs and their use of self-regulatory processes, and we consider the implications of this research for designing training interventions to enhance students' academic agency.

ADOLESCENCE AND THE DEVELOPMENT OF PERSONAL AGENCY

In both the schools and the larger society, the onset of adolescence marks a profound shift in expectations regarding students' ability to assume responsibility for their functioning. When students enter middle or junior high schools, they are no longer under the direct control of a single teacher but instead are taught by a number of teachers in different classrooms, often with different classmates. These adolescents are expected to personally manage these diverse requirements for learning in class or to seek out help when it is needed, especially from their teachers. At this middle level of schooling, a significant part of students' academic work is completed outside of class, including reading assigned texts, writing papers, and preparing for tests. Adolescents' success in making this developmental transition is complicated by a major increase in the difficulty of the academic work that is assigned in middle or junior high schools (Wigfield, Eccles, & Pintrich, 1996). If adolescents fail to regulate this demanding academic environment effectively, their academic grades will likely decline—often leading to a loss of self-efficacy about succeeding in school. As their self-efficacy diminishes, adolescents can become embedded in a downward cycle of academic achievement that may involve aligning themselves with peers who possess unfavorable views about the value and importance of school (Steinberg, Brown, & Dornbusch, 1996). Conversely, adolescents with a strong sense of efficacy for learning are more resilient and better able to resist the adverse academic influences of low-achieving peers than are those with a weak sense of efficacy (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996).

To succeed in school, adolescents develop diverse self-regulatory skills, such as goal setting, self-monitoring, time management, and self-evaluation. Homework assignments must be transformed into personal goals; study time needs to be allocated prudently; and completion of the goals needs to be self-monitored closely. Adolescents also must learn powerful strategies to enhance various forms of learning, such as note-taking, help-seeking, storing and recalling information, reading, writ-

ing, and test preparation (Zimmerman, Bonner, & Kovach, 1996). Strategies are also beneficial in assisting them to manage out-of-school extracurricular activities, such as music or sports (Cleary & Zimmerman, 2001; McPherson & Zimmerman, 2002). Unfortunately, adolescents are often poor at setting goals and anticipating the consequences of various courses of action. As a result, they fail to employ effective task-specific strategies such as preparing for tests. Later in this chapter, we will discuss how effective strategies can be learned through observation of successful models and from personal experiences with success and failure. We will also describe how self-regulated students cope with failure in a sequence of cyclical self-processes without experiencing a loss of self-efficacy and how this resilient sense of self-efficacy can sustain their efforts to learn in a self-directed way. This belief in one's self-regulative capability to attain goals is the core of a resolute sense of personal agency.

WHAT IS SELF-EFFICACY AND HOW ARE THESE BELIEFS DISTINCTIVE?

Self-efficacy refers to subjective judgments of one's capabilities to organize and execute courses of action to attain designated goals (Bandura, 1977, 1997). It is a belief about what a person *can* do rather than personal judgments about one's physical or personality attributes. It is also context-specific and varies across several dimensions, such as level, generality, and strength. The *level* of self-efficacy refers to its dependence on the difficultly level of a particular task, such as math addition problems of increasing difficulty; *generality* of self-efficacy beliefs refers to the transferability of one's efficacy judgments across different tasks or activities, such as different academic subjects; *strength* of efficacy judgments pertains to the certainty with which one can perform a specific task (Zimmerman, 1995).

The construct of self-efficacy has a variety of distinctive characteristics. These features are important because they provide a point of comparison with other constructs and have implications for how self-efficacy perceptions should be measured. First, self-efficacy judgments focus on perceived capabilities to perform an activity rather than on personality or psychological traits or characteristics (Zimmerman, 1995). In other words, self-efficacy addresses "how well can I do something?" rather than "what am I like?" Second, self-efficacy percepts are distinctive because they are not only domain-specific but are also context- and task-specific. In terms of context-specificity, a student may express a lower sense of efficacy to learn mathematics in competitive classroom

structures than in cooperative ones. However, self-efficacy measures are also multi-dimensional in nature in that they vary across specific tasks or activities within a particular domain. For example, one may report feeling capable of performing addition and multiplication problems but may have low efficacy perceptions for solving subtraction and division problems. This multi-dimensional level of analysis is a hallmark feature of microanalytic, self-efficacy assessment (Bandura, 1997; Cleary & Zimmerman, 2004).

A third feature of self-efficacy is its dependence on a mastery criterion of performance rather than on normative or other criteria. For example, students rate how well they can write an essay at a specific level of performance rather than how much better they can write than their peers. Finally, self-efficacy beliefs are typically assessed prior to engaging in a particular task or activity. This antecedent property provides the temporal ordering necessary for assessing the role of efficacy percepts in causal structures. As a result, self-efficacy has been conceptualized as a forethought process within self-regulation models because of its proactive impact on performance and self-evaluative processes following performance (Zimmerman, 2000).

HOW IS SELF-EFFICACY DIFFERENT FROM OTHER TYPES OF SELF-BELIEFS?

Expectancy-Related Constructs

Constructs often confused with self-efficacy pertain to individuals' self-perceptions regarding their personal qualities, characteristics, and/or competencies. These include self-concept, self-esteem, outcome expectations, and locus of control. Although these terms are often mistakenly used interchangeably by laypersons, they represent quite distinct constructs.

Self-Concept

Although the conceptual distinction between self-efficacy and self-concept beliefs may appear minimal at first glance, the two constructs represent different phenomena (Bandura, 1986). Self-concept refers to a generalized self-assessment incorporating a variety of self-reactions and beliefs such as feelings of self-worth and general beliefs of competence. In contrast, self-efficacy beliefs are context-specific judgments of personal capability to organize and execute a course of action to attain a set goal. Self-efficacy focuses more specifically on the tasks or activities that an individual feels capable of performing rather than a more global assess-

ment of "how good you are at something" as provided in assessments of self-concept. It should be noted that measures of self-concept may include self-efficacy items but also incorporate items pertaining to self-esteem and global perceptions of competence.

The distinction between these two self-perceptions has been established empirically by a number of researchers (see Bong & Skaalvik, 2003). For example, Pajares and Miller (1994) used path analysis to examine the predictive and mediational roles of self-efficacy in the mathematical problem-solving skills of college students. The researchers developed a model incorporating variables such as self-efficacy, self-concept, perceived usefulness, prior mathematics experience, and mathematics problem-solving. Self-efficacy was a better predictor of math performance than was self-concept and also exerted an indirect impact on performance through self-concept. Thus, self-efficacy enhances academic performance directly as well as indirectly through its influence on a student's self-concept.

Self-Esteem

Self-esteem has been defined as a type of belief involving judgments of self-worth. It is an *affective* reaction indicating how a person feels about him- or herself. This is quite distinct from self-efficacy perceptions, which involve *cognitive* judgments of personal capability (Pintrich & Schunk, 2002). Perceptions of worth or self-esteem may develop from a person's global self-perception (i.e., self-concept) as well as from a variety of other sources, such as possession of attributes that are either valued or de-valued by society (Bandura, 1997). Thus, a person may establish feelings of worth or think "I am a good person" if she perceives herself as being competent in particular domains or as possessing socially-important characteristics, such as altruism and empathy.

Although positive self-esteem is desirable and even necessary for adaptive functioning, the key issues are whether self-esteem is related to self-efficacy perceptions and whether it is a distinctive predictor of academic performance from self-efficacy. The comparative effects of self-efficacy and self-esteem have been investigated by Mone, Baker, and Jeffries (1995), who studied the validity of self-efficacy and self-esteem for predicting the personal goals and performance of college students. Students were given these measures prior to three exams throughout the semester. Self-efficacy accounted for almost half of the variance in the prediction of goals and between 6% and 14% of the variance in the prediction of performance. Self-esteem was not predictive of either outcome. Clearly, self-efficacy is a distinctive predictor of academic outcomes compared to self-esteem. These findings lend support for the contention that the predic-

tiveness of self-perception measures increase as the task-specificity of the items increase.

Outcome Expectations

Although it has been argued that outcome expectations are distinctive and important for understanding behavior (Bandura, 1997), research has shown that self-efficacy beliefs are usually better predictors of behavior than are outcome expectations (Schunk & Miller, 2002). Shell, Murphy, and Bruning (1989) examined the predictive power of self-efficacy and outcome expectations on reading and writing achievement. Self-efficacy was assessed as a student's perceived capability to perform various reading and writing tasks, whereas outcome expectations were students' ratings of the importance of reading and writing skills in attaining various outcomes in employment, social endeavors, family life, and education. Although self-efficacy and outcome expectations accounted for 32% of the variance in reading achievement, self-efficacy accounted for most of that variance (28%).

Perceived Control

The construct of perceived control, which emerged from earlier research on locus of control (Rotter, 1966), is concerned with general expectancies that outcomes are controlled by either one's behavior or by external events. This dualistic view of control suggests that an internal locus of control promotes self-directed behavior, whereas external locus of control inhibits one's agentic abilities. Perceptions of control and perceived self-efficacy are similar in that they both deal with how individuals can act in agentic ways on their environment. Self-efficacious individuals and those with an internal locus of control will exhibit more self-directed behavior than will low self-efficacious individuals or those with an external locus of control. However, similar to the distinction between outcome expectations and self-efficacy, perceived control does not take into account how confident an individual feels about performing specific tasks within a particular context. In addition, Bandura (1986, 1997) questioned the value of de-contextualized perceptions of control. In support of this conclusion, Smith (1989) found that locus of control did not predict improvement in academic performance and did not reduce the anxiety of anxious students who underwent coping skills training. Self-efficacy, however, did predict such improvements. In essence, self-efficacy judgments differ from other expectancy constructs because they are task- and context-specific and focus exclusively on one's perceptions of capability.

HOW DO SELF-EFFICACY BELIEFS AFFECT ADOLESCENTS' SCHOOL-RELATED FUNCTIONING?

One might argue that assessing adolescents' self-beliefs and perceptions of capability is important because it can help parents and teachers empathize with or at least better understand how adolescents interpret and perceive the world in which they live. Although enhanced parental and teacher understanding is beneficial, the key issue for educators involves whether self-efficacy has a significant impact on adolescents' ability to succeed in school. In this section, we discuss the relationship between self-efficacy and three important variables related to school functioning: academic motivation, academic achievement, and academic and personal development. The causal influence of self-efficacy on these variables will be emphasized.

Academic Motivation

Motivation has been defined by social cognitive researchers as a process in which goal-directed behavior is instigated and sustained (Pintrich & Schunk, 2002). It is an important variable because it has been consistently associated with academic competence (Linnenbrink & Pintrich, 2002) and is often the subject of teacher concerns about students struggling in school. Motivation can manifest itself in various forms such as effort, persistence, and choice of activities—indexes that are hypothesized to be influenced by students' self-efficacy (Bandura, 1977). This hypothesis has been consistently confirmed by researchers over the past few decades (Bandura, 1997; Pajares, 1996; Schunk, 1981; Schunk & Hanson, 1985). That is, when students believe that they can perform a task in a proficient manner, they will become more engaged in the activity, work harder, and sustain high levels of effort even when obstacles are encountered.

In terms of effort, two measures have typically been employed in research: rate of performance and expenditure of energy (Zimmerman, 1995). There is supporting evidence for the association between self-efficacy and both indexes. Schunk and his colleagues showed that students' perceived self-efficacy for learning correlates positively with their rate of solution of arithmetic problems (Schunk, 1981; Schunk & Hanson, 1985). In addition, Salomon (1984) examined the relationship between sixth grade students' self-efficacy for learning from text and both mental effort and achievement. The self-efficacy of students who were exposed to the print material were positively associated with mental effort and achievement. That is, as students' confidence in their abil-

ity to learn from the print material increased, so did their perceived mental effort to complete the task.

Self-efficacy has also been consistently associated with levels of persistence (Bouffard-Bouchard, Parent, & Larivée, 1991; Multon, Brown, & Lent, 1991; Schunk, 1981). When they view a task as difficult, students with higher self-efficacy tend to be more persistent than are students with lower self-efficacy. Zimmerman and Ringle (1981) assigned children to either an optimistic or a pessimistic model condition, wherein the children observed an adult attempt the solution of an unsolvable wire puzzle. The optimistic model expressed confidence about solving the puzzle (e.g., "I am sure I can separate these wires; I just have to keep trying different ways, and then I will find the right one") whereas the pessimistic model expressed concern about solving it (e.g., "I don't think I can separate these wires; I have tried many different ways and nothing seems to work"). Students in the optimistic condition felt more efficacious about being able to solve a similar puzzle and persisted longer than did students in the pessimistic group during an opportunity to solve the problem. The optimistic students also persisted longer in solving an embedded word problem. This study demonstrated that vicariously-induced self-efficacy not only enhanced persistence on a similar motoric puzzle but also facilitated transfer in persistence to a verbal puzzle within the same experimental context. In addition to its effects on persistence, self-efficacy has been shown to be predictive of students' choice of activities (Bandura & Schunk, 1981; Zimmerman & Kitsantas, 1999).

Academic Achievement

Although student motivation is an important issue, the bottom line often entails improving students' academic skills and maximizing their overall performance in school. It is widely accepted that students' academic success is influenced primarily by their cognitive abilities. That is, students with great intellectual potential will often succeed at a higher level than will students with lower ability. However, given that the correlation between IQ and achievement is typically only in the moderate range, it seems reasonable to suggest that cognitive potential does not always translate into attained success. Just as there are intellectually gifted individuals who do not perform well, there exist many lower ability students who perform at or above age or grade expectations. Although it is clear that many variables interact to produce this phenomenon, we will consider the role that self-efficacy perceptions play in determining how well individuals perform academically.

Merely possessing knowledge and skills does not mean that one will use them effectively under difficult conditions (Bandura, 1993). Students often encounter obstacles during learning. These can include noisy study environments, disruptive thoughts, negative emotional reactions, and poor organization skills. Those who are more self-efficacious about being able to effectively manage and cope with these circumstances are expected to have a higher probability of succeeding, even if others have the same inherent ability or skill level. Collins (1982) studied students of high or low perceived math self-efficacy within each of three levels of math ability: high, intermediate, and low. At each level of math ability, students who were assured of their self-efficacy discarded faulty solution strategies more quickly, reworked more failed problems, and achieved higher math performance than did students who were low in their sense of self-efficacy. Thus, self-efficacy was a better predictor of positive attitudes to mathematics than was actual ability. Similar results were reported by Bouffard-Bouchard (1990) who experimentally increased the self-efficacy of students at two levels of ability on a novel problem-solving task. The students' self-efficacy was varied through arbitrary feedback. Regardless of their pretest level of ability, students whose self-efficacy was raised used more effective strategies and were more successful in their problem solving than students whose self-efficacy was lowered. These studies revealed that students' self-efficacy beliefs contribute to academic performance over and above the effects of their ability (Bandura, 1993).

There is much evidence documenting the significant relation between self-efficacy beliefs and achievement in academic settings (Bandura, 1997; Multon et al., 1991; Schunk, 1981; Schunk & Miller, 2002), athletics (Zimmerman & Kitsantas, 1996), health-promoting behavior, and coping skills. In the academic domain, Multon et al. (1991) meta-analyzed results of studies conducted between 1977 and 1988 to examine the effect of efficacy beliefs on academic achievement. The studies assessed academic performance in a variety of ways, including basic cognitive skills, academic course work, and standardized tests, and they were diverse in terms of sample and experimental design. Multon et al. reported an overall effect size of 0.38, indicating that self-efficacy accounted for approximately 14% of the variance in students' academic performance. Self-efficacy was most predictive of academic accomplishments when posttreatment efficacy beliefs were used as predictors. Thus, assessing students' efficacy prior to instruction, although important, will not be as predictive of academic achievement as measuring these beliefs following instruction or modeling experiences.

Path analytic studies have shown that self-efficacy has a direct effect on students' academic performance across academic domains such as writing

and mathematics (Pajares & Miller, 1994; Schunk, 1981; Zimmerman & Bandura, 1994). For example, Pajares and Kranzler (1995) investigated the impact of mathematics self-efficacy and general aptitude on the mathematics problem-solving skills of high school students. The researchers wanted to assess the unique contribution made by self-efficacy to the prediction of academic achievement when a measure of general intelligence, or *g*, was included in the model. The path model included mathematics self-efficacy, general mental ability, math anxiety, high school math level, and gender. Although it is widely recognized that the *g* factor is a strong predictor of academic performance, results revealed that self-efficacy and general mental ability had comparable direct effects on students' math problem-solving skills. Thus, even when the effects of general cognitive ability are controlled, adolescents' perceptions of efficacy are able to account for unique variance in an academic outcome. Self-efficacy also mediated the effects of general cognitive ability and math anxiety on overall math performance.

Academic and Personal Development

To understand the role of self-efficacy perceptions on adolescents' academic and personal development, Bandura and his colleagues at the University of Rome have undertaken a series of ecological studies (e.g., Bandura, Barbaranelli, Caprara, & Pastorelli, 1996, 2001). The studies have included a wide network of parent, student, and teacher measures. Bandura (1997) cautioned against adopting narrow measures of either self-efficacy or personal functioning when broad developmental issues are of interest. From a social cognitive perspective, students' academic functioning is influenced by a number of nonacademic but school-related context variables as well as by academic variables. For example, students who cannot form and maintain positive social relationships with classmates or who have trouble self-regulating their behavior will often suffer academically as well as socially and personally. Three general types of students' efficacy beliefs were investigated: social functioning (e.g., forming and maintaining peer relationships), personal self-regulatory functioning (e.g., resisting peer pressure to engage in high risk activities like drugs and alcohol), and academic functioning (e.g., self-regulating learning and mastering various types of subject matter). Also included were a wide range of nonacademic measures of adolescent functioning (e.g., depression, problem behaviors, moral disengagement, prosocial behavior, and peer preferences) as well as academic achievement measures. In addition to these student measures, parental self-efficacy measures (e.g., ability to influence their children's development) and parental academic aspirations for their

children (e.g., expected performance and amount of schooling) were included in the research design.

Using a path analysis, Bandura et al. (1996) found that the influence of the families' socioeconomic status was entirely mediated through parents' academic aspirations and children's prosocial behavior, such that the higher the status of the family, the higher the parents' academic aspirations for their children and the greater their children's pro-social behavior. All three forms of children's self-efficacy contributed to academic achievement, but through different paths of mediating variables. For example, children's self-regulatory efficacy influenced achievement directly and by reducing problem behaviors. Although children's academic self-efficacy directly enhanced academic achievement, it also influenced this achievement indirectly via reductions in depression, increases in pro-social behavior, and increases in the children's academic aspirations. The children's academic aspirations were also influenced directly by their parents' academic aspirations. A high degree of pro-social behavior influenced the children's peer preferences and prevented them from disengaging their moral standards or engaging in problem behaviors. The combined variables in this path model accounted for 58% of the variance in the children's academic achievement. This ecological account of children's academic development reveals that children who doubt their efficacy reduce their academic aspirations, experience greater depression, and develop less prosocial and more problem behavior. Over time, students' growing doubts about their intellectual capabilities and the resulting deficiencies in academic skill are likely to foreclose occupational avenues for them.

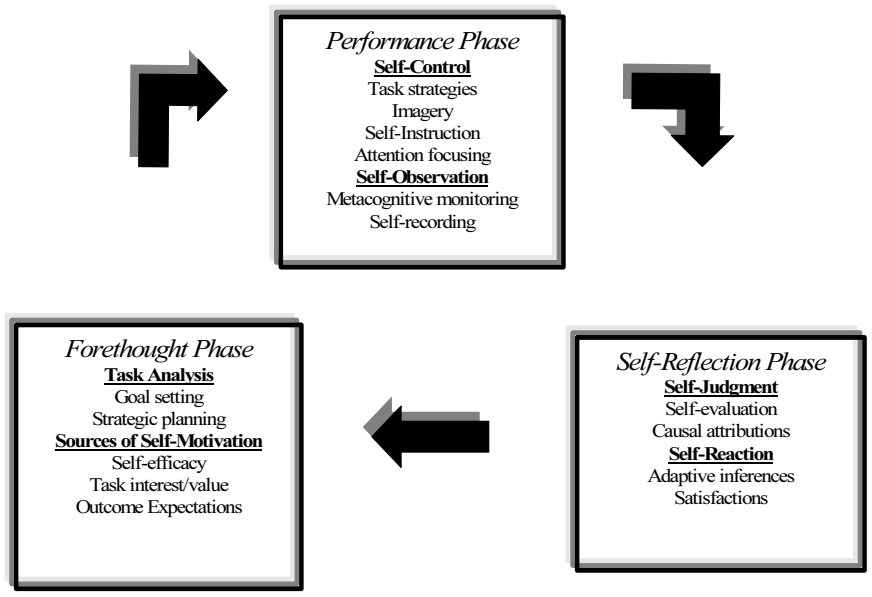
In a subsequent study of these children's career choices, Bandura et al. (2001) studied the influence of the children's three general types of self-efficacy, academic aspirations, and academic achievement on their efficacy perceptions regarding six specific career paths (science-technology, education-medical, literary-art, social service, military-police, and agricultural-horticultural). These types of occupational self-efficacy proved to be key determinants of the children's career choices. Interestingly, students' academic achievements did not directly predict their career choice but rather were mediated via their occupational self-efficacy beliefs. Clearly self-efficacy play a major role in students' academic and career development.

DOES ENHANCING SELF-EFFICACY EMPOWER STUDENTS TO BECOME MORE SELF-DIRECTED, INDEPENDENT LEARNERS?

The primary goals of secondary education are to teach students content knowledge in a particular subject area and to build students' reading, writing, and arithmetic skills. Given the proliferation of federal mandates

for establishing minimum academic proficiency levels and statewide tests for assessing students' academic skills, it is understandable that education focus intensely in these areas. However, a broader, more long-term goal of secondary education should involve empowering students to become independent, self-regulated learners. When students graduate from high school and go on to college or enter the workforce, one hopes they feel a sense of personal agency for effectively and responsibly managing their own behavior and acting on the world in which they live. Individuals who seek to proactively and efficiently manage their lives to achieve self-set goals are often called self-regulated learners. Self-regulated individuals naturally feel empowered because of their adaptive self-motivational beliefs, particularly with regard to their perceptions of personal capability. In this section, we will explore the reciprocal links between students' self-efficacy and their self-regulated behaviors.

From a social cognitive perspective, self-regulation has been defined as self-generated thoughts, feelings, and actions that are planned and cyclically adapted based on performance feedback to attain self-set goals (Zimmerman, 2000). It is a complex, multi-faceted process that integrates several motivational and self-processes (see Figure 2.1). These motivational and self-processes are hypothesized to operate in a cyclical feedback loop, whereby a learner gathers and uses feedback information to make adjustments during current and future learning attempts (Zimmerman, 2000). This cyclical loop includes three general phases: forethought (processes that precede efforts to act), performance control (processes that occur during learning) and self-reflection (processes that occur after performance). It is hypothesized that forethought processes influence performance control phase processes, which in turn influence self-reflection phase processes. A cycle is complete when the self-reflection processes influence forethought processes during a subsequent learning attempt. Self-efficacy beliefs exist within this system of self-regulatory beliefs and processes. These beliefs are critical to the forethought phase process because it can sustain high levels of motivation and resiliency in learners when they encounter obstacles or difficulties in learning. It should be noted that, although self-efficacy is presented as a forethought process, it has direct influences on many of the self-regulation processes throughout the entire cyclical feedback loop. We will review the relationship between students' self-efficacy and key forethought phase processes (e.g., goal setting, strategic planning, self-motivational beliefs), performance control phase processes (e.g., self-observation, strategy use) and self-reflection phase processes (e.g., self-evaluative standards, attributions).



Source: Zimmerman and Campillo (2003, p. 239), Reprinted with permission.
Figure 2.1 Phases and subprocesses of self-regulation.

Forethought Phase Processes

Goal-Setting

Goal-setting has been defined as deciding on specific outcomes of learning or performance, such as learning the steps of a writing strategy or achieving a grade of 100 on a science test (Locke & Latham, 1990). Beliefs of personal capabilities affect the type of goals that individuals select and their commitment to them (Zimmerman, 1995). For example, when individuals feel capable of performing a particular task, they are more likely to set challenging and specific goals (Bandura, 1986; Zimmerman, Bandura, & Martinez-Pons, 1992). In a study with adolescent basketball players, Cleary and Zimmerman (2001) investigated self-efficacy differences between expert, non-expert, and novice players as well as the relationship between self-efficacy and other self-regulatory processes. Participants were asked to rate their self-efficacy for making two free-throw shots in a row as well as to identify any goals they had before practicing their free-throws. Individuals who were highly confident about making the free-throws tended to set more *specific* outcome goals (e.g., "to make 10 out of 10 shots"), whereas those who were not confident tended to set vague outcome goals (e.g., "to make baskets"). Specific goals are

advantageous because they enable one to evaluate personal progress more effectively.

Other studies have examined the causal effect of self-efficacy on goal-setting and academic achievement (Zimmerman & Bandura, 1994). Zimmerman et al. (1992) performed a path analysis to analyze the causal effects of several variables, such as prior grades, parent grade goals, student grade goals, self-efficacy for self-regulated learning, and self-efficacy for academic achievement on high school students' grades in social studies. Although self-efficacy for academic achievement directly predicted students' social studies grades, it also had a direct effect on the goals that students set for themselves. That is, individuals who were highly confident in their ability to earn a high grade were more likely to set *challenging* academic goals. These studies are important because they suggest that, as perceptions of capability increase, one will likely set more specific, challenging goals, the types of goals that lead to the most positive outcomes (Locke & Latham, 1990).

Although self-efficacy beliefs can influence self-regulation processes, this relationship is reciprocal in that manipulating self-regulation processes can also produce changes in one's self-perceptions. Goal-setting influences self-efficacy perceptions because it enables learners to evaluate goal progress and personal mastery over tasks (Schunk & Miller, 2002). Several experimental studies using academic and athletic tasks have shown that the types of goals students set for themselves directly influence their self-efficacy and achievement (Schunk & Rice, 1989, 1991). Schunk and Swartz (1993) conducted one of the first studies to assess how process goals influenced student writing skills and self-efficacy perceptions. Grade 5 students were randomly assigned to different writing strategy instructional groups based on type of goal (process, product, or general goals). Students who set process goals (i.e., focus on executing the writing strategy) exhibited higher perceptions of writing self-efficacy than did students who set general goals (i.e., do your best). When a progress feedback condition was given to some of the students in the process goal group, they exhibited more adaptive efficacy beliefs than did students in either the product goal or general goal conditions.

In a study of athletic functioning in adolescent girls, Zimmerman and Kitsantas (1996) compared the effects of process and outcome goals on the dart skill, self-efficacy, and level of satisfaction of the novice dart-throwers. Girls were randomly assigned to one of four conditions based on type of goals (process or outcome) and self-recording (present or absent). All participants received identical throwing instructions, but the process goal group was instructed to focus on the dart-throwing strategy while practicing. In reference to the goal-setting effects, girls who were in the process goal group had higher dart-throwing scores and self-efficacy

perceptions than did the girls who set outcome goals (i.e., to obtain the highest score).

These studies suggest that encouraging adolescent students to set process goals will have both achievement and motivational advantages because it directs attention to executing the essential aspects of a particular task. Process goals encourage learners to keep track of how well they perform a strategy, evaluate goal progress, and judge perceptions of competence.

Strategic Planning

Before students can engage in academic pursuits, they must learn methods that are appropriate for a particular task within a specific context (Zimmerman, 2000). Strategies can be thought of as purposive personal processes and actions directed at acquiring knowledge or skills. They are important because they represent the tools with which individuals learn and improve their performance and level of skill. A variety of descriptive studies have investigated the relationship between use of learning strategies and self-efficacy perceptions. Zimmerman and Martinez-Pons (1990) investigated this with students in Grades 5, 8, and 11. They hypothesized that measures of self-efficacy would be predictive of students' use of self-regulated learning strategies. Verbal self-efficacy accounted for 18% of the variance in strategy use and was predictive of using several different types of strategies.

In the study of athletes earlier discussed, Cleary and Zimmerman (2001) showed that the self-efficacy beliefs of adolescent basketball players were not just predictive of whether one will use a strategy, but also of the quality and type of strategy used. Participants were asked to rate their self-efficacy as well as the strategy that they would use to achieve a shooting goal during a practice session. Given that the self-efficacy question was asked prior to the strategy question, the resulting correlation reflected self-efficacy predicting strategy use. Individuals who were highly self-efficacious usually selected technique-specific strategies (e.g., "bend my knees correctly") to achieve their goals, whereas those who doubted their capabilities rarely endorsed this type of strategy. The use of these technique-oriented strategies was important because they directly corresponded to the correct shooting form, thus focusing the individual's attention on important shooting form processes rather than on other external or distracting factors. Although this study does not imply causation between self-efficacy and strategy use, it does suggest that confident individuals may tend to use strategies that are specific to the task at hand.

Some experimental studies have established a causal link between self-efficacy and strategy use (e.g., Schunk & Rice, 1991). Schunk and Swartz (1993) found that students whose self-efficacy increased as a result of

goal-setting and progress feedback were more likely to continue to use the writing strategies effectively in follow-up assessments.

Sources of Self-Motivation

Zimmerman's model of self-regulation incorporates various motivational processes such as self-efficacy, outcome expectations, and task interest or valuing. The model predicts that self-efficacy, being the key motivational process, will be related to the other motivational processes. A series of studies conducted with expert and novice athletes (Cleary & Zimmerman, 2001; Kitsantas & Zimmerman, 2002; Zimmerman & Kitsantas, 1996, 1997) support these predictions. In most of the studies, students' level of self-efficacy is typically predictive of task interest and of value for accomplishing future goals (a form of outcome expectations). Pajares and Miller (1994) used path analysis to study the predictive and mediational role of college students' mathematics self-efficacy beliefs. They reported that self-efficacy beliefs had a direct effect on students' perceived usefulness of mathematics for achieving various life goals. That is, when individuals were more confident in their personal capabilities in mathematics, they were more likely to perceive mathematics as being valuable and important. Although these findings support the premise that different motivational beliefs are related to each other, at this point the precise nature of this relationship is not well understood. It is important for future research to examine the effects of different thresholds of self-efficacy on other motivational beliefs.

Performance Control Phase Processes

Self-Observation

Self-observation (also called self-monitoring) is a performance control phase process that involves selectively attending to particular aspects of one's behavior or performance (Schunk, 1983; Zimmerman & Paulsen, 1995). It is an important process because it helps learners discriminate between effective and ineffective performances and helps to isolate the source of error or confusion when one is performing poorly. Similar to the relationship between self-efficacy and other self-regulation processes, there is a reciprocal relation between efficacy judgments and self-monitoring behaviors. Individuals with high self-efficacy will often be motivated to self-monitor and will be more proficient at monitoring their behaviors during an academic activity (Schunk, 1983; Zimmerman & Paulsen, 1995). Bouffard-Bouchard et al. (1991) examined the effects of efficacy

beliefs on self-monitoring during a learning activity with junior high and high school students and reported that students with higher self-efficacy were better at monitoring their working time, were more persistent, and were less likely to reject correct hypotheses prematurely than were those who did not feel as capable.

There is also evidence for self-monitoring processes directly influencing one's self-efficacy beliefs. In a classic self-monitoring study, Schunk (1983) examined whether self-monitoring would influence elementary school students' subtraction skills and self-efficacy to solve subtraction problems. All students received 30-minute training sessions that involved instruction and individual practice sessions. In addition, some were taught to self-monitor the number of pages they completed during each session. The self-monitoring group reported higher self-efficacy for solving problems and had higher scores on a skills test than did the group who did not self-monitor. The effects of self-monitoring on self-efficacy have also been demonstrated in a training study of writing revision (Zimmerman & Kitsantas, 1999). Adolescent girls who were required to record specific steps of a text revision strategy exhibited higher levels of writing skill and self-efficacy than did girls who learned without self-recording.

Self-Reflection Processes

Self-Evaluation

Self-efficacy beliefs not only influence the goals students set for themselves but also their evaluative reactions of goal progress. The role of self-efficacy beliefs concerning the academic attainment and regulation of writing, academic goals, and self-standards in the development of writing proficiency was studied with college freshmen using path analysis (Zimmerman & Bandura, 1994). Two scales were developed to measure self-efficacy. The first assessed beliefs about personal capability to regulate writing activities (e.g., "I can rewrite my wordy or confusing sentences clearly"), and the second asked students to rate the strength of their belief that they could attain particular achievement outcomes (e.g., an A- in the course). Students' self-evaluative standards were assessed in terms of their level of satisfaction and dissatisfaction for different writing grades. The key result was the causal link between the students' self-regulatory self-efficacy for writing with their personal standards of performance. Students who felt more confident in their ability to regulate the writing process set high personal standards for the quality of their writing and thus were more easily dissatisfied than were students who possessed low self-efficacy.

Conversely, the process of self-evaluating one's abilities or one's progress in strategy or skill acquisition is important for cultivating strong

self-efficacy (Schunk, 2003). It is the cognitive appraisal of one's personal improvement or progress that will ultimately lead to fluctuations in one's capability judgments. For example, if a student is not satisfied with her performance on a math test but believes that her future performance could be improved by adjusting ineffective strategies, then her self-efficacy beliefs will not diminish. This phenomenon has been demonstrated in experimental studies involving the use of self-monitored information about performance processes to evaluate one's skill on a particular task (Zimmerman & Kitsantas, 1999).

Attributions

Efficacy beliefs are influenced by a variety of factors such as prior accomplishments and vicarious experiences. Although mastery experiences are the strongest source of self-efficacy, cognitive analysis of one's performance experiences is a key mediating factor for changing capability judgments. From a self-regulatory perspective, after students perform a task or an activity, they will often evaluate or reflect cognitively on the perceived causes of that performance. These causes are termed causal attributions (Zimmerman, 2000). Attribution theorists contend that students' perceptions of the causes of their academic successes and failures determine their expectancies for future performance (Weiner, 1986). For example, Jen's motivation would be heightened if she attributed her poor performance in math to internal, controllable factors such as effort and strategy use, but it would decrease if she attributed it to uncontrollable factors such as luck or ability (Cleary & Zimmerman, 2001; Clifford, 1986).

As with most self-regulatory processes, there is empirical evidence showing a reciprocal relationship between students' causal attributions and their perceptions of personal efficacy. That is, highly efficacious students believe performance outcomes to be personally controllable (Bandura, 1997), so they tend to attribute failure to factors that they can change. Conversely, students with low self-efficacy attribute failure to uncontrollable factors, thereby increasing feelings of despair and helplessness (Silver, Mitchell, & Gist, 1989). These types of attributions are particularly important because they encourage students to make *adaptive* changes or self-adjustments to their learning methods following failure or poor performances. In addition, students who are provided strategy or effort feedback following performance on academic tasks often experience increases in their personal efficacy (Pintrich & Schunk, 2002; Schunk & Rice, 1991). In the following section, we consider the role of attribution as well as other forms of self-regulatory training on students' self-efficacy and academic performance.

HOW CAN WE ENHANCE ADOLESCENT STUDENTS' SELF-EFFICACY PERCEPTIONS?

Although it is important for parents and educators to understand the nature and role of self-efficacy in children's and adolescents' academic functioning, the ultimate question is how to cultivate or enhance students' perceptions of personal agency. The previous section on the reciprocal relationship between self-efficacy beliefs and self-regulatory processes showed that training students in self-regulation processes such as goal setting, self-monitoring, and strategic planning can increase their confidence levels to perform specific tasks in school. These interventions can be loosely categorized under one of the four sources of self-efficacy as identified by Bandura (1986). He argued that an individual's self-efficacy perceptions are influenced by one's prior accomplishments/mastery, physiological reactions, vicarious experiences, and forms of persuasion.

Personal mastery experiences, which involve one's accomplishments, are the strongest source of enhancing perceptions of personal efficacy (Bandura, 1997; Schunk, 2003). There are numerous studies showing that as one's mastery or proficiency at an activity increases, so does one's self-efficacy (Schunk, 1981; Schunk & Schwartz, 1993; Zimmerman & Kitsantas, 1996). In general, frequent successes lead to higher self-efficacy, and consistent failure experiences usually lower it. However, this general rule of thumb requires qualification. Accomplishments are interpreted in light of one's self-regulatory processes, such as self-evaluations, attributions, strategy use, and goal setting. For example, self-efficacy percepts depend on how an individual evaluates the circumstances and factors surrounding the accomplishments (Bandura, 1986; Schunk & Pajares, 2004). If a student receives a 95% on a math test but perceives the test to be easier than typical math tests, it is unlikely that her efficacy judgments will change. Conversely, failing her next math test may not adversely affect her self-efficacy if she believes that an external factor, such as a family emergency, prevented her from studying and caused her to fail. Similarly, students who select a strategy to revise an essay and use the strategy as a process goal to guide and self-monitor learning are less likely to attribute poor results to fixed abilities and more likely to sustain their self-efficacy to ultimately master the task (Zimmerman & Kitsantas, 1999). The second source of self-efficacy, physiological reactions, can also influence how an individual makes an efficacy judgment. If a student gets extremely anxious during math activities, she may interpret her rapid heart rate or sweating palms as indicators of personal ineffectiveness.

An important aspect of social cognitive theory is its assumption that an individual's social milieu is a primary determinant of his or her functioning, attitudes, and beliefs (Bandura, 1986). Adolescent students do not

have to act or engage in an activity to learn or to feel confident in their abilities. Rather, their sense of efficacy can be either enhanced or lowered by the behaviors and/or feedback given by important individuals in their lives such as parents, teachers, counselors, and peers. Social agents promote positive perceptions of efficacy in adolescents by either using various forms of verbal persuasion (e.g., encouragement, progress feedback) or by modeling specific strategies, behaviors, or thoughts.

Adolescents will often judge their level of self-efficacy through vicarious experiences, most notably modeling, which has been defined as the behavioral, cognitive, and affective changes resulting from observing other individuals perform a behavior (Pintrich & Schunk, 2002). Modeling is one of the most important ways to promote learning and self-efficacy (Schunk, 1981, 2003; Schunk & Hanson, 1985). The impact of a model on self-efficacy beliefs will be strongest when observers believe that they can be successful if they follow the model's behaviors and if they believe they are similar to the model in terms of age, ability, and gender (Schunk, 1987; Schunk, Hanson, & Cox, 1987). It should also be noted that models can be different types of individuals (e.g., peers and adults), can take various forms (e.g., live models and symbolic models), and can be used in different formats (e.g., coping and mastery models). Coping models, who display confidence and adaptation when confronting errors in learning are significantly more effective in sustaining students' perceptions of self-efficacy than are mastery models who perform without errors (Kitsantas, Zimmerman, & Cleary, 2000; Schunk et al., 1987; Schunk & Hanson, 1985; Zimmerman & Kitsantas, 2002).

Social persuasion is another source of information that adolescents use to shape and form perceptions of personal capability. Although encouraging comments (e.g., "I know you can do it") and reassuring statements from a parent or teacher (e.g., "You will do better next time") may help struggling students sustain their motivation in the short-term, the effects of such statements will be short-lived if the student is consistently unable to attain perceived successes. However, social agents can play a key role in cultivating more long-lasting changes in adolescents' self-efficacy beliefs for academic tasks by providing them with feedback linking performance progress with *strategy use* (Cleary & Zimmerman, 2004, Schunk & Rice, 1991; Schunk & Swartz, 1993). Social feedback is important not only for its impact on self-efficacy beliefs but also because it focuses a student's attention on important learning processes. It also enables students to make adaptive self-reflections, such as evaluating their performance in relation to mastery goals and attributing poor performances to ineffective strategy use (Cleary & Zimmerman, 2004; Zimmerman, 2000). Thinking in the "language of strategies" motivates adolescents because they begin

to view success and failures in terms of successfully using "controllable" strategies rather than innate, unchangeable factors such as ability.

CONCLUSION

Adolescents' perceptions of efficacy play a major role in their transition from childhood dependency to adulthood self-sufficiency. Ecologically-oriented research has shown that adolescents' self-efficacy beliefs emerge from a rich and complex interplay of forces in which these beliefs are both causes and effects of personal and academic functioning as well as future occupational choices. Bandura (1997) hypothesized that self-efficacy beliefs interact with many other determinants of academic functioning—personal, contextual, and behavioral. For this reason, self-efficacy measures are designed to reveal the task-, condition-, and context-specificity of personal competence beliefs and to be sensitive to changes in functioning. Although the importance of self-efficacy is now well established, the magnitude of its effect varies considerably depending on other variables. Adolescents' sense of personal efficacy is especially influenced by their capability to self-regulate their functioning, such as setting optimal goals, implementing effective strategies, self-monitoring accurately, self-evaluating using appropriate criteria, and attributing causation to adaptable processes. When training interventions are designed to enhance these and other academic self-regulatory functions, adolescents are significantly empowered to make this vital developmental transition.

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