

ATTAINING SELF-REGULATION

A SOCIAL COGNITIVE PERSPECTIVE

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1. INTRODUCTION

Perhaps our most important quality as humans is our capability to self-regulate. It has provided us with an adaptive edge that enabled our ancestors to survive and even flourish when changing conditions led other species to extinction. Our regulatory skill or lack thereof is the source of our perception of personal agency that lies at the core of our sense of self. Understanding how this capability develops, its various subcomponents, and its functions has been a major thrust of social cognitive theory and research. Of equal importance is the explanation for common dysfunctions in self-regulatory functioning, such as biased self-monitoring, self-blaming judgments, and defensive self-reactions. This chapter will define self-regulation and will discuss the structure of self-regulatory systems, social and physical environmental context influences on self-regulation, dysfunctions in self-regulation, and self-regulatory development.

A. A TRIADIC DEFINITION OF SELF-REGULATION

A social cognitive perspective is distinctive in viewing self-regulation as an interaction of *personal*, *behavioral*, and *environmental* triadic processes (Bandura, 1986). More specifically, it entails not only behavioral skill in

self-managing environmental contingencies, but also the knowledge and the sense of personal agency to enact this skill in relevant contexts. Self-regulation refers to self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals. This definition, in terms of actions and covert processes whose presence and quality depends on one's beliefs and motives, differs from definitions emphasizing a singular trait, ability, or stage of competence. A process definition can explain why a person may self-regulate one type of performance but not another. This personal agency formulation also differs from metacognitive views of self-regulation that emphasize only knowledge states and deductive reasoning when, for example, choosing cognitive strategies. Although metacognition plays an important role, self-regulation also depends on self-beliefs and affective reactions, such as doubts and fears, about specific performance contexts (Zimmerman, 1995b). Aspiring chess players may try to emulate a well known defense strategy but often abandon it when their confidence falters during a competitive match. Contextually related self-processes, such as perceived efficacy, have been shown to be well suited to explaining variations in personal motivation to self-regulate one's performance (Bandura, 1997; Pajares & Miller, 1994; Zimmerman, 1995a). Self-efficacy refers to beliefs about one's capabilities to organize and implement actions necessary to attain designated performance of skill for specific tasks.

Self-regulation is described as cyclical because the feedback from prior performance is used to make adjustments during current efforts. Such adjustments are necessary because personal, behavioral, and environmental factors are constantly changing during the course of learning and performance, and must be observed or monitored using three self-oriented feedback loops (see Figure 1). *Behavioral self-regulation* involves self-observing and strategically adjusting performance processes, such as one's method of learning, whereas *environmental self-regulation* refers to observing and adjusting environmental conditions or outcomes. *Covert self-regulation* involves monitoring and adjusting cognitive and affective states, such as imagery for remembering or relaxing. The accuracy and constancy of learners' self-monitoring of these triadic sources of self-control directly influence the effectiveness of their strategic adjustments and the nature of their self-beliefs. These triadic feedback loops are assumed to be open. Unlike closed-loop views, which limit self-regulation to reducing performance discrepancies *reactively* against an unchanging standard (Locke, 1991), open-loop perspectives include *proactively* increasing performance discrepancies by raising goals and seeking more challenging tasks. For example, when chess players decide to move up to a new level of competition, they make success more difficult to achieve but use the outcome discrepancies as a way to motivate themselves to attain higher levels of

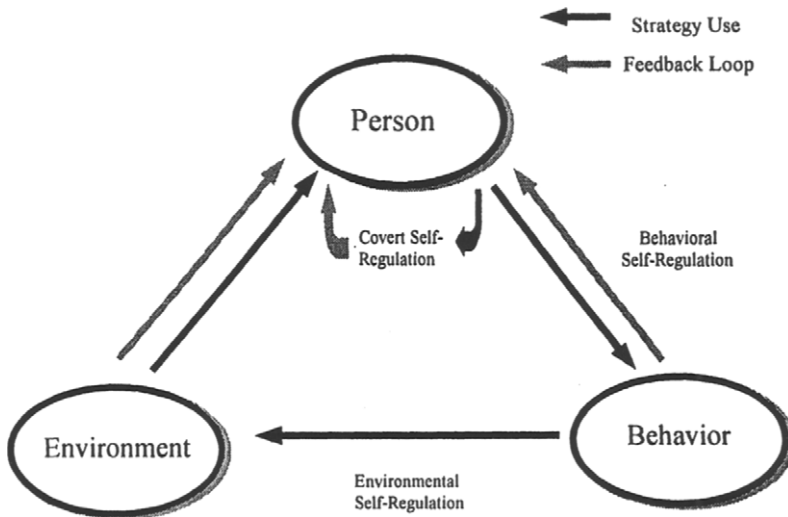


FIGURE 1 Triadic forms of self-regulation. *Note.* From "A social cognitive view of self-regulated academic learning," by B. J. Zimmerman, 1989, *Journal of Educational Psychology*, 81, p. 330. Copyright 1989 by the American Psychological Association. Adapted with permission.

skill. Thus, self-regulation involves triadic processes that are proactively as well as reactively adapted for the attainment of personal goals.

II. THE STRUCTURE OF SELF-REGULATORY SYSTEMS

It has been argued that every person attempts to self-regulate his or her functioning in some way to gain goals in life and that it is inaccurate to speak about un-self-regulated persons or even the absence of self-regulation (Winne, 1997). From this perspective, what distinguishes effective from ineffective forms self-regulation is instead the quality and quantity of one's self-regulatory processes. The most effective processes have been identified through a variety of empirical sources, including interviews with experts who are known for their self-discipline and success (e.g., Ericsson & Lehman, 1996; Zimmerman & Martinez-Pons, 1986, 1988), clinical studies of individuals experiencing self-regulatory dysfunctions (Watson & Tharp, 1993), and experimental research on personal methods of control during demanding performance tasks (Kanfer & Ackerman, 1989; Kuhl, 1985). An important issue is to understand how these processes are structurally interrelated and cyclically sustained.

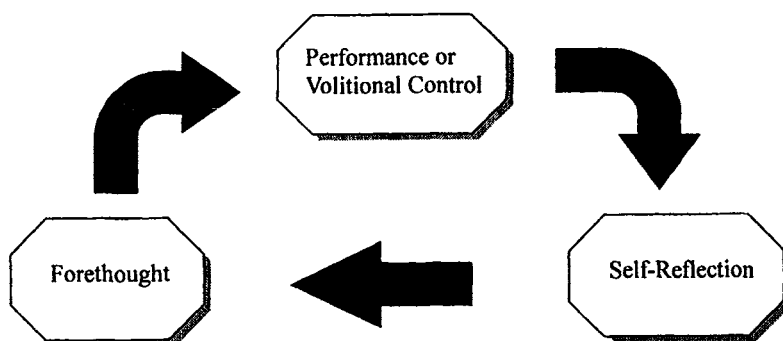


FIGURE 2 Cyclical phases of self-regulation. *Note.* From *Self-Regulated Learning: From Teaching to Self-Reflective Practice*. (p. 3), by D. H. Schunk and B. J. Zimmerman (Eds.), 1998, New York: Guilford. Copyright 1998 by Guilford Press. Reprinted with permission.

From a social cognitive perspective, self-regulatory processes and accompanying beliefs fall into three cyclical phases: forethought, performance or volitional control, and self-reflection processes (see Figure 2). Forethought refers to influential processes that precede efforts to act and set the stage for it. Performance or volitional control involves processes that occur during motoric efforts and affect attention and action. Self-reflection involves processes that occur after performance efforts and influence a person's response to that experience. These self-reflections, in turn, influence forethought regarding subsequent motoric efforts—thus completing a self-regulatory cycle.

A. FORETHOUGHT PHASE

There are two distinctive but closely linked categories of forethought: (1) task analysis and (2) self-motivational beliefs (see Table 1). A key form of task analysis involves the setting of goals. *Goal setting* refers to deciding

TABLE 1 Phase Structure and Subprocesses of Self-Regulation

Cyclical self-regulatory phases		
Forethought	Performance/volitional control	Self-reflection
Task analysis	Self-control	Self-judgment
Goal setting	Self-instruction	Self-evaluation
Strategic planning	Imagery	Causal attribution
Self-motivation beliefs	Attention focusing	Self-reaction
Self-efficacy	Task strategies	Self-satisfaction/affect
Outcome expectations	Self-observation	Adaptive-defensive
Intrinsic interest/value	Self-recording	
Goal orientation	Self-experimentation	

upon specific outcomes of learning or performance, such as solving a group of division problems in mathematics during a study session (Locke & Latham, 1990). The goal systems of highly self-regulated individuals are organized hierarchically, such that process goals operate as proximal regulators of more distal outcome goals. These process subgoals are not merely mechanical check points on the path to attaining highly valued outcomes; instead they become invested with personal meaning because they convey evidence of progress. For example, a pupil learning a tennis serve will feel an increasing sense of efficacy about mastering this stroke as components of it are acquired, such as the take back of the racket, the ball toss, and the follow-through. Bandura and Schunk (1981) reported evidence that as students pursued and attained proximal goals in mathematics, they developed greater self-efficacy and intrinsic interest in this topic.

A second form of task analysis is *strategic planning* (Weinstein & Mayer, 1986). For a skill to be mastered or performed optimally, learners need methods that are appropriate for the task and the setting. Self-regulative strategies are purposive personal processes and actions directed at acquiring or displaying skill (Zimmerman, 1989). Appropriately selected strategies enhance performance by aiding cognition, controlling affect, and directing motoric execution (Pressley & Woloshyn, 1995). For example, key word or integrative image strategies are known to enhance the recall and use of information during motoric performance (Schneider & Pressley, 1997). The planning and selection of strategies requires cyclical adjustments because of fluctuations in covert personal, behavioral, and environmental components. No self-regulatory strategy will work equally well for all persons, and few, if any, strategies will work optimally for a person on all tasks or occasions. As a skill develops, the effectiveness of an initial acquisition strategy often declines to the point where another strategy becomes necessary, such as when a novice golfer shifts from a swing execution strategy to a ball flight aiming strategy. Thus, as a result of diverse and changing intrapersonal, interpersonal, and contextual conditions, self-regulated individuals must continuously adjust their goals and choice of strategies.

Self-regulatory skills are of little value if a person cannot motivate themselves to use them. Underlying forethought processes of goal setting and strategic planning are a number of key self-motivational beliefs: self-efficacy, outcome expectations, intrinsic interest or valuing, and goal orientation. As was noted earlier, *self-efficacy* refers to personal beliefs about having the means to learn or perform effectively, whereas *outcome expectations* refer to beliefs about the ultimate ends of performance (Bandura, 1997). For example, self-efficacy refers to the belief that one can attain a course grade of A, and outcomes refer to expectations about the consequences this grade will produce after graduation, such as a desirable job. A person's willingness to engage and sustain their self-regulatory

efforts depends especially on their self-regulatory efficacy, which refers to beliefs about their capability to plan and manage specific areas of functioning. There is evidence that self-regulatory efficacy beliefs causally influence use of such regulatory processes as academic learning strategies (Schunk & Schwartz, 1993; Zimmerman, Bandura, & Martinez-Pons, 1992), academic time management (Britton & Tessor, 1991), resisting adverse peer pressures (Bandura, Barbaranelli, Caprara & Pastorelli, 1996b), self-monitoring (Bouffard-Bouchard, Parent, & Larivee, 1991), self-evaluation, and goal setting (Zimmerman & Bandura, 1994).

For example, self-efficacy beliefs influence goal setting in the following way: The more capable people believe themselves to be, the higher the goals they set for themselves and the more firmly committed they remain to those goals (Bandura, 1991; Locke & Latham, 1990). When people fall short of attaining their outcome goals, those who are self-efficacious increase their efforts, whereas those who are self-doubters withdraw (Bandura & Cervone, 1986). Goals can reciprocally affect self-efficacy beliefs. Self-regulated learners feel self-efficacious in part because they have adopted hierarchical process goals for themselves whose progressive mastery provides them with immediate satisfaction rather than requiring them to suspend any sense of success until a final outcome goal is attained. There is evidence that process goal attainment can become intrinsically motivating in its own right and can even outweigh attainment of superordinate outcome goals (Schunk & Schwartz, 1993; Zimmerman & Kitsantas, 1997).

With time, process goal seekers begin to see outcome rewards merely as milestones in a lifelong mastery process, such as when musicians see the ultimate value of their talent lies in performing masterfully rather than in winning a particular competition. In this way, process accomplishments provide a sense of *intrinsic* motivation or valuing that can complement and even surpass extrinsic outcomes (Deci, 1975; Lepper & Hodell, 1989). This self-regulatory process *goal orientation* also has been labeled a learning (Dweck, 1988), a mastery (Ames, 1992), or a task goal orientation (Nicholls, 1984), and has been shown to sustain motivation and improve acquisition and performance better than an outcome goal orientation (Pintrich & Schunk, 1996).

B. PERFORMANCE OR VOLITIONAL CONTROL PHASE

Two major types of performance or volitional control processes have been studied to date: self-control and self-observation. Self-control processes, such as self-instruction, imagery, attention focusing, and task strategies, help learners and performers to focus on the task and optimize their effort. *Self-instruction* involves overtly or covertly describing how to proceed as one executes a task, such as solving a mathematics problem or

memorizing a formula, and research shows that such verbalizations can improve students' learning (Schunk, 1982). Meichenbaum (1977) has been at the forefront of efforts to enhance students' self-instruction during learning efforts, especially with learning disabled children. *Imagery* or the forming of mental pictures is another widely used self-control technique to assist encoding and performance. In a series of influential studies, Pressley and colleagues (Pressley 1977; Pressley & Levin, 1977) taught learners to mentally construct integrative images, such as a knife piercing a hat, to improve their recall of these two items. Sports psychologists have taught competitors, such as skaters, divers, or gymnasts, to imagine successful executions of their planned routines in order to enhance their performance (Garfield & Bennett, 1985).

A third form of self-control, *attention focusing*, is designed to improve one's concentration and screen out other covert processes or external events. Expert performers report using a wide variety of techniques to improve their attentional control, such as environmental structuring to eliminate diversions or slow-motion task execution to assist coordination (Mach, 1988). Kuhl and his colleagues (Kuhl, 1985) studied the use of volitional methods of control, such as ignoring distractions and avoiding ruminating about past mistakes, and found them to be effective. There is evidence that knowing how to concentrate and screen out other covert processes and external events is an essential strategy for effective studying (Corno, 1993; Weinstein, Schulte, & Palmer, 1987). *Task strategies* assist learning and performance by reducing a task to its essential parts and reorganizing the parts meaningfully. For example, when students listen to a history lecture, they might identify a limited number of key points and record them chronologically in brief sentences. The effectiveness of a wide variety of task strategies has been studied by Weinstein and Mayer (1986), Wood, Woloshyn, and Willoughby (1995), and Zimmerman and Martinez-Pons (1988) to guide learning efforts, and the effectiveness of these strategies is well documented. These included study strategies, such as note taking, test preparation, and reading for comprehension, as well as performance strategies, such as writing techniques, elocution, and problem solving.

The second type of volition or performance control process involves self-observation. This refers to a person's tracking of specific aspects of their own performance, the conditions that surround it, and the effects that it produces (Zimmerman & Paulsen, 1995). Although this skill may seem elemental, it is not, because the amount of information involved in complex performances can easily inundate naive self-observers and typically can lead to disorganized or cursory self-monitoring. Experts are able to track themselves selectively at a detailed process level when necessary, such as when concert pianists monitor their hand positions, which enables them to make more fine-grained adaptations than novices (Mach, 1988).

Setting hierarchical process goals during forethought facilitates selective self-observation because these goals focus on specific processes and proximal events.

There are a number of features of self-observation that can influence its effectiveness. The temporal proximity of one's self-observations is a critical variable (Bandura, 1986; Kazdin, 1974). Self-feedback that is delayed precludes a person from taking corrective action in a timely fashion, such as monitoring one's running time after the completion of a long distance track race rather than during it. A second feature of high quality self-observation is the informativeness of performance feedback. Practicing a skill in a standardized or structured setting can enhance informativeness of the results (Ericsson & Lehman, 1996). For example, practicing sprints on an official 100 meter track permits runners to see if changes in technique improve their competitive speed. A third qualitative feature is the accuracy of self-observations: Individuals who misperceive or distort their actions cannot correct them appropriately. For example, there is evidence that speakers of minority dialects needed special training to discriminate erroneous word pronunciations before they could practice in a self-corrective fashion on their own (Ellis, 1995). A fourth qualitative feature of self-observation involves the valence of the behavior. Monitoring negative aspects of one's functioning, such as cigarettes smoked or dietary failures, can diminish a persons' motivation to self-regulate these activities (Kirschenbaum & Karoly, 1977). Often it is possible to record performance accomplishments rather than deficits, such as days without smoking or the frequency of dietary success. Undoubtedly, feedback about deficits can lead to self-criticism.

Self-recording is a common self-observational technique that can increase greatly the proximity, informativeness, accuracy, and valence of feedback (Zimmerman & Kitsantas, 1996). Records can capture personal information at the point it occurs, structure it to be most meaningful, preserve its accuracy without need for intrusive rehearsal, and provide a longer data base for discerning evidence of progress. For example, asthmatics who keep records of their symptoms can discern their allergy triggers as well as the effectiveness of preventive medications (Bonner, Rivera, & Zimmerman, 1997).

Through observation of covert thought patterns and emotional reactions as well as overt performance, people begin to notice recurrent patterns in their functioning, such as when or where a smoker craves cigarettes or actually smokes them. If any regularities in pattern can be discerned, they can be used to identify influential features of their environment, such as consistently smoking after eating or in the presence of other smokers. For those individuals who can alter their behavior or modify their environment, these insights can lead to corrective courses of action, such as avoiding places where smokers congregate.

Self-observation can lead to cycles of *self-experimentation* (Bandura, 1991). When self-observation of natural variations in behavior does not provide decisive diagnostic information, people can engage in personal experimentation by systematically varying the aspects of their functioning that are in question. For example, when the urge to smoke may seem random and spontaneous, a smoker may test out various contextual hypotheses, such as the presence of stress, ash trays, or advertisements. In this way systematic self-observation can lead to greater personal understanding and to better performance or volitional control.

C. SELF-REFLECTION PHASE

Bandura (1986) has identified two self-reflective processes that are closely associated with self-observation: self-judgment and self-reactions. *Self-judgment* involves self-evaluating one's performance and attributing causal significance to the results. *Self-evaluation* refers to comparing self-monitored information with a standard or goal, such as a sprinter judging practice runs according to his or her best previous effort. Judging the adequacy of one's performance is relatively easy when it produces simple objective outcomes, such as being able to swim, drive an automobile, or solve a mathematical problem. However, high levels of expertise depend on the judgments using refined criteria, such as swimming 100 meters in a particular time period or faster than 98% of other swimmers. Ultimately, the adaptive quality of one's self-reactions depends on the sensitivity of his or her self-judgments (Zimmerman & Paulsen, 1995), and knowing this, experts set challenging criteria for themselves (Ericsson & Lehman, 1996).

There are four distinctive types of criteria that people use to evaluate themselves: mastery, previous performance, normative, and collaborative. Mastery criteria involve the use of a graduated sequence of tests or test scores ranging from novice to expert performance, such as the seven point system that tennis instructors use to rate players. Mastery hierarchies also have been used for testing and curriculum selection in schools, such as workbooks that are color coded for level of expertise. Mastery criteria have been advocated by Covington and Roberts (1994) because they highlight evidence of personal learning progress in the attainment, which usually occurs with continuing practice. The use of process goal hierarchies predisposes a person to adopt a mastery criterion for self-evaluation because the sequential order of the subgoals provides an ready index of mastery.

Previous performance or self-criteria involves comparisons of current performance with earlier levels of one's behavior, such as a baseline or the previous performance (Bandura, 1997). For example, smokers can judge their success in overcoming this habit by comparing cigarettes smoked currently with the previous day's level of consumption. Like mastery

comparisons, self-comparisons involve within-subject changes in functioning, and as a result, they also highlight learning progress, which typically improves with repeated practice.

In contrast to mastery or previous performance criteria, normative criteria involve social comparisons with the performance of others, such as classmates or a national population that was tested. Awards are given at most competitions on the basis of social rankings, such as the gold medalist at the Olympics, who is the person who comes in first regardless of whether or not he or she breaks the existing world record. Normative criteria can be defended on the basis of the competitive nature of many human enterprises, such as employment and sales. In these circumstances, a person must be not only effective or skilled, but also must be better than a competitor. Among the drawbacks of using normative criteria for self-evaluative judgments is the fact they deemphasize selective self-observation and conversely heighten attention to social factors. Another shortcoming is that social comparisons often tend to emphasize negative aspects of functioning instead of the positive ones, such as when a person loses the race despite having improved his or her time in comparison to previous efforts. Learners who focus on outcome goals are predisposed to using normative criteria for self-evaluative judgments because outcomes are often competitively awarded and socially visible, such as grades in school.

Finally, a collaborative criterion is used primarily in team endeavors (Bandura, 1991). Under these common but more complex circumstances, success is defined in terms of fulfilling a particular role, such as the point guard on a basketball team. The criteria of success for a point guard are different than those used for the other team positions, and how well a point guard can work cooperatively with his or her teammates becomes the ultimate criterion of success.

Self-evaluative judgments are linked to *causal attributions* about the results, such as whether poor performance is due to one's limited ability or to insufficient effort. These attributional judgments are pivotal to self-reflection, because attributions of errors to a fixed ability prompt learners to react negatively and discourage efforts to improve (Weiner, 1979). There is recent evidence (e.g., Zimmerman & Kitsantas, 1996, 1997) that attributions of errors to learning strategies are highly effective in sustaining motivation during periods of subpar performance because strategy attributions sustain perceptions of efficacy until all possible strategies have been tested. Attributions are not automatic outcomes of favorable or unfavorable self-evaluations, but rather depend on cognitive appraisal of extenuating factors, such as perceptions of personal efficacy or mitigating environmental conditions (Bandura, 1991). For example, when workers receive a negative evaluation for their job performance, those who are self-efficacious are more likely to attribute it to insufficient effort or a poor task strategy than those who are self-doubters. Alternatively, workers who

felt the evaluation occurred during atypical circumstances, such as when directed by a temporary supervisor, might attribute it to bad luck rather than inability.

Forethought processes also impact attributional judgments. People who plan to use a specific strategy during forethought and implement its use during performance are more likely to attribute failures to that strategy rather than low ability, which can be devastating personally (Zimmerman & Kitsantas, 1997). Because strategies are perceived as correctable causes, attributions to their use protect against negative self-reactions and foster a strategically adaptive course of subsequent action.

Self-evaluative and attributional self-judgments are linked closely to two key forms of self-reactions: self-satisfaction and adaptive inferences. *Self-satisfaction* involves perceptions of satisfaction or dissatisfaction and associated affect regarding one's performance, which is important because people pursue courses of action that result in satisfaction and positive affect, and avoid those courses that produce dissatisfaction and negative affect, such as anxiety (Bandura, 1991). When self-satisfaction is made conditional on reaching adopted goals, people give direction to their actions and create self-incentives to persist in their efforts. Thus, a person's motivation does not stem from the goals themselves, but rather from self-evaluative reactions to behavioral outcomes.

A person's level of self-satisfaction also depends on the intrinsic value or importance of the task. For example, people who greatly value their job will experience severe dissatisfaction and anxiety if they receive unfavorable performance ratings. However, individuals who view their position as only temporary employment and unworthy of serious consideration will not be overly distressed by unfavorable job ratings. Highly self-regulated people value their intrinsic feelings of self-respect and self-satisfaction from a job well done more highly than acquiring material rewards (Bandura, 1997).

Adaptive or defensive inferences are conclusions about how one needs to alter his or her self-regulatory approach during subsequent efforts to learn or perform. Adaptive inferences are important because they direct people to new and potentially better forms of performance self-regulation, such as by shifting the goals hierarchically or choosing a more effective strategy (Zimmerman & Martinez-Pons, 1992). In contrast, defensive inferences serve primarily to protect the person from future dissatisfaction and aversive affect, but unfortunately they also undermine successful adaptation. These defensive self-reactions include helplessness, procrastination, task avoidance, cognitive disengagement, and apathy. Garcia and Pintrich (1994) have referred to such defensive reactions as self-handicapping strategies, because, despite their intended protectiveness, they ultimately limit personal growth.

These self-reactions affect forethought processes cyclically and often dramatically impact future courses of action toward one's most important goals and away from one's deepest fears. For example, self-satisfaction reactions strengthen self-efficacy beliefs about eventually mastering the academic skill, learning goal orientations (Schunk, 1996), and intrinsic interest in the task (Zimmerman & Kitsantas, 1997). These enhanced self-motivational beliefs form the basis for peoples' sense of personal agency about continuing their cyclical self-regulatory efforts and eventually attaining their goals. In contrast, self-dissatisfaction reactions reduce one's sense of efficacy and intrinsic interest in pursuing the task further. Bandura (1997, *in press*) has discussed many examples of how a person's feelings of self-efficacy can dramatically alter his or her life path, such as when dissatisfaction with grades in a chemistry course undermines a premed student's sense of efficacy to continue in the program. Thus, a cyclical social cognitive model can explain the persistence and sense of self-fulfillment of achievers as well as the avoidance and self-doubts of nonachievers.

III. SOCIAL AND ENVIRONMENTAL INFLUENCES ON SELF-REGULATION

A key feature of a social cognitive model of self-regulation is the interdependent roles of social, environmental, and self influences. As was illustrated in Figure 1 regarding triadic feedback loops, environmental and personal (self) processes interact bidirectionally in naturalistic settings. Self-initiated processes alter one's social and physical environment, and are in turn affected by those changes, such as when a mother puts a note on the refrigerator (an environmental cue) to remind herself or other family members (a social resource) to buy milk. From a triadic perspective, people who neglect to use social and physical environmental resources or who view them as an obstacle to personal development will be less effective in regulating their lives. Internal views of self-regulatory functioning, such as will power beliefs, are often based on insufficient information about the social and environmental nature of skilled functioning (Ericsson & Charness, 1994; Newman, 1994; Thoresen & Mahoney, 1974).

Even with the seemingly solitary and highly personal craft of writing, there is abundant evidence (Zimmerman & Risemberg, 1997) of the value of social and physical environmental regulation techniques, such as emulating the styles of exemplary models, soliciting assistance from teachers or confidants, and restructuring the writing setting. Regarding the self-selected use of modeling, the famed publisher, scientist, and statesman Benjamin Franklin improved his writing style by imitatively practicing passages written by exemplary writers of his day. One of the most unusual forms of

social assistance was reported by Victor Hugo, who enlisted the aid of a servant. Because this novelist had so much trouble resisting the temptations of tavern life while writing, he gave his clothing to his valet with strict orders not to return them until he had completed a manuscript. Writers have used an interesting assortment of methods to self-regulate their writing environment. For example, the French poet and novelist Cendrars wrote only in a small enclosed place to screen out visual distractions (Plimpton, 1965) and the French novelist Marcel Proust wrote in a cork-lined room he had constructed to block outside sounds (Barzon, 1964). In addition to these instances of modeling and environmental structuring, there is evidence (Zimmerman & Risemberg, 1997) that professional writers rely on many other social and environmental resources, such as record keeping, to assist them during forethought and self-control of their functioning.

The social milieu influences self-reflection processes in a similar fashion to forethought and performance phase processes. Youth often form standards for self-evaluative judgment on the basis of instruction, social feedback, and modeling from peers, parents, teachers, and coaches. For example, child prodigies often come from families where successful parents, siblings, or relatives model high standards of performance and self-judgment (Mach, 1988). Verbal self-criticism and pessimism or self-praise and optimism are often visible to others, and these vicarious cues can convey standards for self-reaction to an observer (Zimmerman & Ringle, 1981).

People can increase their self-reactions by using environmental supports, such as self-administered rewards or praise. Athletic coaches frequently advise their pupils to reward themselves with refreshment breaks for completing effective exercise or practice sessions or to "pump themselves up" by making self-congratulatory comments for scoring a winning point. A relatively common technique to motivate oneself to complete daily activities is to put off favored activities, such as relaxing breaks or recreational activities, until after completing less attractive ones. The writer Irving Wallace (1971) reports that novelists can increase the amount they write by making pursuit of other activities contingent upon attaining certain amounts or time periods of writing. Tangible self-rewards are designed to increase people's reactions to their performance and outcome expectations. There is evidence (Bandura & Kupers, 1964) that individuals who reward their own attainments accomplish more than those who perform the same activities without self-administered incentives.

Thus, the social and physical environment is viewed by social cognitive researchers as a resource for self-enhancing forethought, performance or volitional control, and self-reflection. Modeling and instruction serve as a primary vehicle through which parents, teachers, and communities socially convey self-regulatory skills, such as persistence, self-praise, and adaptive

self-reactions to children. Conversely, when social models demonstrate impulsiveness, self-criticism, or defensive self-reactions, or when social groups reward or accept such actions, a wide array of personal dysfunctions often ensue.

IV. DYSFUNCTIONS IN SELF-REGULATION

The consequences of dysfunctions in personal regulation have been enormous, particularly in Western societies with their many freedoms. Low self-regulatory skill is associated with a wide range of personal problems. For example, there is evidence that students who have trouble self-regulating their academic studying achieve more poorly in school (Zimmerman and Martinez-Pons, 1986, 1988) and present more deportment problems for their teachers (Brody, Stoneman, & Flor, 1996). Poor regulation of one's health through an improper diet, failure to take needed medicines, and exposure to disease also has had a costly impact on lives. For example, people who cannot self-regulate the chronic disease of asthma display higher levels of symptoms, lower quality of life, and are hospitalized more frequently (Zimmerman, Bonner, Evans, & Mellins, 1999). The inability of girls to self-regulate their weight is a very prevalent health problem that often results in binge eating, anorexia, and bulimia. Similarly, boys' misguided regulatory efforts to develop a muscular body have often led to use of use of hazardous food additives or drugs, questionable forms of exercise, and a wide range of somatic problems. In addition to these difficulties, a major cause of death, injury, and sickness among youth and young adults is their failure to self-regulate a variety of dangerous behaviors, such as drinking alcohol, taking recreational drugs, engaging in unprotected sex, and driving with excessive speed. Even the incidence of misbehavior, aggression, and crime has been associated with low impulse control and disengagement of moral self-regulatory standards (Bandura, Barbaranelli, Caprara, & Pastorelli 1996a). These self-regulatory problems extend well beyond mere misinformation about dangerous or healthful personal practices; they stem from entrenched self-beliefs, habits, and styles of living (Prochaska, DiClemente, & Norcross, 1992). As a result, their solution often requires arduous changes in behavior, home and work settings, and, in some cases, even one's social groups. How can such changes be effected? What is the nature and cause of the underlying self-regulatory dysfunctions?

From a social cognitive perspective, dysfunctions in self-regulation are chiefly due to the ineffective forethought and performance control techniques, such as planning one's daily diet and self-recording the frequency of exercise to control weight (Bandura, 1991; Zimmerman, 1998). Instead of using these *proactive methods*, the poorly self-regulated rely primarily

on *reactive methods* to manage personal outcomes, such as skipping meals when a scale reveals excess body weight. As previously mentioned, reactive methods of self-regulation are generally ineffective because they fail to provide the necessary goal structure, strategic planning, and sense of personal agency for students to progress consistently. Instead, dysfunctional self-regulators try to correct themselves using post hoc task outcomes, which are often delayed, difficult to interpret, and socially stigmatizing, such as gains in weight. Success is not an objective property of performance results, but rather depends on the criteria by which they are self-evaluated, such as self-comparisons with a fashion model's type of body (Bandura, 1991). Whereas reactive self-regulators lack specific process goals and baseline information, they must rely on social comparisons to evaluate their outcomes, which are frequently unfavorable and often lead to fixed ability attributions, self-dissatisfaction, and defensive self-reactions. Because of these adverse self-reactions to their task outcomes, reactive self-regulators experience not only a loss of self-efficacy about subsequent performance efforts, but also a decline in intrinsic interest in the academic task (Zimmerman & Kitsantas, 1996).

What types of experiential deficits or inherited personal limitations may predispose a person to rely on reactive methods of self-regulation? A *lack of social learning experiences* is the first important source of self-regulatory dysfunctions. Many forms of self-regulation are difficult to learn by individuals who grow up in homes or communities where they are not taught, modeled, or rewarded. Brody and his colleagues (Brody & Flor, in press; Brody, Stoneman, & Flor, 1996) have found that parental processes play an important role in children's self-regulatory development and that significant numbers of children lack sufficient self-regulatory skill to manage personal problems and achieve consistently in school. Children whose parents set clear "no nonsense" standards and closely monitor their school activity and achievement display not only greater self-regulation, but also higher levels of social and cognitive development.

A second personal limitation that leads to dysfunctions in self-regulation is motivational; namely, the presence of *apathy or disinterest*. Because the most effective self-regulatory techniques require anticipation, concentration, effort, and careful self-reflection, they are used only when the skill or its outcomes are highly valued. When a skill or its outcomes are not perceived as valuable, there is no incentive to self-regulate. For example, teachers report significant numbers of disengaged students who display apathy or disinterest regarding participation in class or completion of homework (Steinberg, Brown, & Dornbusch, 1996). Because of their low self-confidence and lack of intrinsic interest in school, apathetic students will resort to reactive methods of self-regulation when the academic outcomes become too punishing, such as joining deviant peer groups. There is evidence that parents' motives have an impact on their children's.

For example, parents' academic goals for their children significantly predict their youngsters' academic goal setting and academic achievement (Zimmerman et al., 1992). Although apathy is a very difficult problem to overcome with older children and adults, there is some evidence in the field of health that specially trained social change agents have been successful in prompting apathetic parents to self-record asthma symptoms of their children and, as a result, these parents increased their administration of preventive medications and perceived higher levels of self-efficacy (Bonner et al., 1997).

Mood disorders, such as mania or depression, are a third personal limitation that can cause major dysfunctions in self-regulation. For example, depressives typically exhibit a self-defeating bias, misperceive their performance attainments, or negatively distort their recollections of these attainments (Bandura, 1991). This bias stands in stark contrast to the self-enhancing optimism of nondepressives who remember their successes well, but recall fewer failures than they actually experienced (Nelson & Craighead, 1977). Depressives also set higher standards for themselves than nondepressives (Schwartz, 1974; Simon, 1979) and are quick to blame themselves for failures (Kuiper, 1978). Unfortunately, minimizing one's success only further exacerbates one's sense of despondency.

A fourth common dysfunction in self-regulation is associated with the presence of *learning disabilities*, such as cognitive problems in concentration, recall, reading, and writing. These personal limitations, which are widely believed to have neurological origins, lead to a number of self-regulatory dysfunctions (Borkowski & Thorpe, 1994). For example, learning disabled students set lower academic goals for themselves, have trouble controlling their impulses, and are less accurate in assessing their capabilities. They are also more self-critical and less self-efficacious about their performance and tend to give up more easily than nondisabled students. Fortunately, several efforts to teach the learning disabled compensatory self-regulatory methods for reading and writing dysfunctions have proven effective in teaching attentional and behavioral control, reading, and writing as well as other subject matter skills (Butler, 1998; Graham & Harris, 1994; Schunk, 1998). Thus, although cognitive, affective, and motivational problems produce a range of self-regulatory dysfunctions, there is increasing evidence that interventions that target these dysfunctions are helpful in compensating for them (Schunk & Zimmerman, 1998).

V. DEVELOPMENT OF SELF-REGULATORY SKILL

Although it is possible to develop self-regulatory competence by personal discovery, this path is often tedious, frustrating, and limited in its effectiveness. As Bandura (1986) humorously cautioned, Those who are

foolish enough to try to learn dangerous skills, such as skiing or driving an automobile by trial-and-error, should first check their medical coverage! Fortunately, self-regulatory processes can be acquired from and are sustained by social as well as self sources of influence. Most important task skills, whether they are primarily motoric or cognitive, are initially acquired by observing, reading, or hearing about the performance of skilled models, such as parents, teachers, coaches, or peers with expertise, but how do socially conveyed skills become self-regulated?

According to a social cognitive perspective (Schunk & Zimmerman, 1997; Zimmerman & Bonner, in press), the acquisition of a wide range of task competencies, from personal care skills to academic learning strategies, emerge in a series of regulatory skill levels. As toddlers, children learn that they can acquire new skills or strategies most effectively by watching the performance of skilled adults or sibling models and listening to their verbal explanations and self-expressed beliefs. This awareness of the value of social models remains with them as new skills are acquired throughout life. An *observational level* of skill occurs when learners can induce the major features of the skill or strategy from watching a model learn or perform (see Table 2). In addition to strategic skill, models convey associated self-regulatory processes, such as performance standards, motivational orientations, and values that observers can use personally during subsequent developmental phases. For example, there is evidence (Zimmerman & Ringle, 1981) that the persistence of a model during complex problem solving affects the perseverance of observers. An observational level of proficiency can be assessed through strategy descriptions or vicarious performance predictions (Zimmerman & Blom, 1983). Perceived similarity to a model and vicarious consequences of a model's use of this skill will determine an observer's motivation to develop the skill further (Zimmerman & Rosenthal, 1974). Despite the value of this vicarious information, most learners also need to perform the strategies personally to incorporate them into their behavioral repertoires.

TABLE 2 Developmental Levels of Regulatory Skill

Level	Name	Description
1	Observation	Vicarious induction of a skill from a proficient model
2	Emulation ^a	Imitative performance of the general pattern or style of a model's skill with social assistance
3	Self-control	Independent display of the model's skill under structured conditions
4	Self-regulation	Adaptive use of skill across changing personal and environmental conditions

^aThis level was referred to as imitation in prior descriptions.

Efforts to enact a skill produce proprioceptive cues that must be integrated with vicarious ones. An *emulation level* of self-regulatory skill is attained when a learner's behavioral performance approximates the general strategic form of the model.¹ Seldom does a learner copy the exact actions of the model, but rather he or she emulates the general pattern or style of functioning, such as the type of question a model asks instead of the model's exact words (Rosenthal, Zimmerman, & Durning, 1970). The observer's accuracy can be improved further when a model adopts a teaching role and provides guidance, feedback, and social reinforcement during practice (Kitsantas, Zimmerman, & Cleary, 1999). The motoric and social consequences of the observer's use of this skill will determine the motivation to develop the skill further. It should be noted that the source of learning of regulatory skill is primarily social for these first two levels, but at more advanced levels, the locus shifts to self sources.

Acquiring the use of a skill on one's own usually requires more than exposure to a teacher or model; it also depends on extensive deliberate practice on one's own (Ericsson & Lehman, 1996). Deliberate practice involves performance that is structured (often by teachers) to enhance performance and self-observation. Attainment of a third, *self-controlled level* of self-regulatory skill occurs when learners master the use of a skill in structured settings outside the presence of models, such as when a pianist can play scales fluidly in the major and minor keys. At this level, a learner's use of a skill depends on representational standards of a model's performance (e.g., covert images or verbal recollections of a teacher's performance) rather than an overt social referent (Bandura & Jeffery, 1973). The learner's success in matching that covert standard during practice efforts will determine the amount of self-reinforcement he or she will experience. During this phase, learning strategies that focus on fundamental processes rather than outcomes are most beneficial in producing mastery.

A *self-regulated level* of task skill is achieved when learners can systematically adapt their performance to changing personal and contextual conditions. At this fourth level of skill, the learner can vary the use of task strategies and make adjustments based on outcomes. Such learners can choose a strategy and adapt its features with little or no residual depen-

¹The word "imitation" has been used previously by me and my colleagues to describe level 2 in the development of skill in order to distinguish between the observer's role and the model's during social cognitive learning. Imitation was previously defined in terms of higher order changes in abstract pattern or style rather than individual response components. The word "emulation" will be used in this chapter to emphasize the generative nature of this process and avoid any semantic implication that vicarious learning is limited to mimicry or copying.

dence on the model. The motivation to sustain this level of skill depends on perceptions of self-efficacy. Skills during this phase usually can be performed with minimal process monitoring, and the learners' attention can be shifted toward performance outcomes without detrimental consequences. For instance, a tennis player's attention can be shifted from the execution of the serve to its effective use, such as placing it where it is likely to win a point.

In summary, this multilevel analysis of the development of self-regulatory competence begins with the most extensive social guidance at the first level, and this social support is systematically reduced as learners acquire underlying self-regulatory skill. However, level 4 functioning continues to depend on social resources on a self-selective basis, such as when a professional baseball player seeks advice from a coach during a batting slump. Because self-regulatory skill is context dependent, new performance problems can uncover limitations in existing strategies and require additional social learning experiences. Unlike developmental stage models, this formulation does not assume learners must advance through the four levels in an invariant sequence or that once the highest level is attained, it will be used universally. Instead, like learning hierarchy models, it assumes that students who master each skill level in sequence will learn more easily and effectively. Although level 4 learners have the competence to perform self-regulatively, they may not choose to do so because of the motivational or contextual factors that were discussed at the outset of this chapter. Intentional forethought, proactive performance effort, and self-reflection are mentally and physically demanding activities, and a person may decide to forego their use if he or she feels tired, disinterested, or uncommitted.

There is a growing body of evidence indicating that the speed and quality of learners' self-regulatory development can be enhanced significantly if learners proceed according to a multilevel developmental hierarchy. The sequentiality of the observational and emulation learning levels of self-regulatory development were studied by Kitsantas et al. (1999), who compared the acquisition of dart skill by novice learners who learned initially from modeling with that of learners who initially learned from enactment. In this research, an adult model demonstrated a multistep process dart throwing strategy for some of the high school students and provided social feedback on a selective basis. The results were consistent with a social cognitive view of self-regulatory development. Students who had the benefit of modeling significantly surpassed the dart skill of those who attempted to learn from performance outcomes only. Furthermore, students who received social feedback learned better than those who practiced on their own, but this feedback was insufficient to make up for the absence of vicarious experience. Students exposed to strategic model-

ing also showed higher levels of self-motivation according to an array of measures, such as self-efficacy and intrinsic interest, than students who relied on discovery and social feedback. These results confirmed the sequential advantages of engaging in observational learning before attempting enactive learning experiences.

Another study (Zimmerman & Kitsantas, 1997) tested the sequentiality of self-control and self-regulation skill levels by examining the effectiveness of shifting process goals to outcome goals during dart throwing practice. Recall that process goals were hypothesized to be optimal during the acquisition of self-control, but outcome goals were expected to be superior during the acquisition of self-regulation. Before being asked to practice on their own, all of the high school subjects were taught strategic components of the skill through observation and emulation (levels 1 and 2). The experiment compared the effects of process goals, outcome goals, and shifting goals as well as self-recording during self-controlled practice. The results were consistent with a multilevel hierarchical view of goal setting: Students who shifted goals developmentally from processes to outcomes after reaching level 4 (i.e., having achieved automaticity) surpassed classmates who adhered only to process goals or only to outcome goals in posttest dart throwing skill. In addition to their superior learning outcomes, students who shifted their goals displayed superior self-efficacy perceptions and intrinsic interest in the game. In support of a cyclical view of self-regulation, the students' self-reactions to dart throwing outcomes were highly predictive of their self-efficacy perceptions about dart skill and their intrinsic interest in the game.

VI. FUTURE RESEARCH DIRECTIONS

The social cognitive hypothesis that self-regulation of learning develops initially from social modeling experiences and progresses through increasing levels of self-directed functioning needs further validation in several important ways. First, research on the effects of goal shifting during self-controlled learning (Zimmerman & Kitsantas, 1997) needs to be extended to new tasks to determine whether these goal effects are a general or a task-specific phenomenon. It would be particularly impressive if the transfer task were cognitive in nature, such as an academic learning task, in order to ascertain whether the results generalized beyond motoric functioning. If the advantage of setting process goals before shifting to outcome goals does transfer to a cognitive task, it would further demonstrate the importance of the distinction between the self-control level and self-regulatory levels in this hierarchical model of learning.

Second, research also is needed to extend the distinction between the observational and emulation levels to determine if these vicarious learning effects are general or limited in scope (Kitsantas et al., 1999). As was recommended previously, it would most convincingly dispel concerns about the scope of existing motoric results if transfer were demonstrated with a cognitive learning task. An academic learning study showing that observers who discriminated and abstracted the strategic rule underlying a model's performance (level 1) learn to use an academic skill emulatively (level 2) more readily than those who failed to do so would validate the pedagogical importance of the distinction between the observational and emulation levels of regulatory skill.

Third, the distinction between the second (emulation) level and the third (self-control) level should be tested in future research. This would entail comparing the self-directed practice of learners who had the opportunity to learn through modeling with those who did not. From a social cognitive perspective, it is hypothesized that learners who acquire a high level of emulation accuracy with the support of a model form a motorically detailed representational standard to guide and self-monitor their practice efforts and experience a heightened sense of self-efficacy. These benefits of emulation would enable them to practice more effectively on their own than learners who had acquired only an observational level of skill. This result would demonstrate the pedagogical importance of comprehensive modeling training before engaging in self-controlled learning on one's own.

If these efforts to extend this social cognitive model are successful, they will indicate specifically how human self-regulatory development can be facilitated using social models. This is important because of evidence showing that self-organized learning without a teacher's social guidance can impede students' acquisition of knowledge and skill (Brown & Van Lehn, 1982; Weinert & Helmke, 1995). Teachers who model strategies and verbalize their thought processes as they perform tasks can enhance students' self-regulatory development greatly (Graham & Harris, 1989a, 1989b; Palincsar & Brown, 1984; Sawyer, Graham, & Harris, 1992). Although peer models have been used as well as teachers to guide learning (Schunk, 1987), research is needed on the use of expert peers for instructional purposes during levels 1 and 2. This issue is especially important in future research because peer tutors are often available as a social resource. A key pedagogical issue regarding socially initiated self-regulatory training is when to withdraw the various forms of modeling support. Although social models are advantageous in conveying high quality methods of task skill, they may inhibit learners from assuming self-direction unless these models are phased out as soon as possible. A multilevel model of self-regulatory development seeks to provide teachers, peers, coaches, and learners with specific guidance regarding

optimal timing of instructional shifts between each successive level in the hierarchy.

VII. A CONCLUDING COMMENT

Although there is considerable agreement about the importance of self-regulation to human survival, there has been disagreement about how it can be analyzed and defined in a scientifically useful way. A social cognitive perspective differs markedly from theoretical traditions that seek to define self-regulation as a singular internal state, trait, or stage that is genetically endowed or personally discovered. Instead it is defined in terms of context-specific processes that are used cyclically to achieve personal goals. These processes entail more than metacognitive knowledge and skill; they also include affective and behavioral processes, and a resilient sense of self-efficacy to control them. The cyclical interdependence of these processes, reactions, and beliefs was described in terms of three sequential phases: forethought, performance or volitional control, and self-reflection. An important feature of this cyclical model is that it can explain dysfunctions in self-regulation as well as exemplary achievements. Dysfunctions occur because of the unfortunate reliance on reactive methods of self-regulation instead of proactive methods, which can profoundly change the course of cyclical learning and performance.

An essential issue confronting all theories of self-regulation is how this capability or capacity can be developed or optimized. Social cognitive views place particular emphasis on the role of socializing agents in the development of self-regulation, such as parents, teachers, coaches, and peers. At an early age, children become aware of the value of social modeling experiences, and they rely heavily on them when acquiring needed skills. It was hypothesized that human skills become self-regulated in a series of levels that begin with an observational level of proficiency and then progress to an emulation level of proficiency, thereafter shifting to a self-controlled level, and finally reaching a self-regulated level. Although social support is systematically reduced from levels 1 to 4, it continues to be used as a resource when it is needed during the last two levels. These developmental levels of skill function are like learning hierarchies, and there is evidence that learners who master the skills in sequence display a higher level of skill and experience more satisfying self-reactions and higher perceptions of self-efficacy as well as increase intrinsic interest in the skill. Together these cyclical developments in self-belief are of particular theoretical importance because they suggest that students' attained levels of self-regulatory skill have profoundly altered their forethought,

which according to Bandura (1991) is the ultimate source of human agency.

ACKNOWLEDGMENT

I thank Albert Bandura for helpful comments and suggestions on an earlier draft of this chapter. Correspondence regarding this chapter should be sent to Barry J. Zimmerman, Doctoral Program in Educational Psychology, Graduate School and University Center, City University of New York, 365 Fifth Ave., New York, NY 10016 or bzimmerm@email.gc.cuny.edu.

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