Social Origins of Self-Regulatory Competence

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Abstract:

This article reviews the social origins of students' development of self-regulatory skill with special emphasis on observational learning through modeling. A social cognitive perspective on self-regulation is presented. In this view, students' academic competence develops initially from social sources of academic skill and subsequently shifts to self sources in a series of 4 levels: observational, imitative, self-controlled, and self-regulated. The effects of models on observers depend in part on perceptions of *self-efficacy,* or beliefs about one's capabilities to learn or perform designated behaviors. Research on social influences is reviewed, and includes factors such as cognitive modeling, coping and mastery models, self-modeling, learning goals, and progress feedback. Related theoretical perspectives are discussed along with suggestions for future research.

Article:

Successful adaptation to school requires that students develop *self-regulation,* or processes that activate and sustain cognitions, behaviors, and affects, and that are oriented toward goal attainment (Zimmerman, 1989, 1990). Academic self-regulatory processes include planning and managing time; attending to and concentrating on instruction; organizing, rehearsing, and coding information strategically; establishing a productive work environment; and using social resources effectively (Kanfer & Kanfer, 1991; Karoly, 1993; Pressley et al., 1990; Zimmerman, 1994). Self-regulation also incorporates motivational processes such as setting performance goals and outcomes; holding positive beliefs about one's capabilities; valuing learning and its anticipated outcomes; and experiencing positive affects (e.g., pride, satisfaction) with one's efforts (McCombs, 1989; Schunk, 1994).

The development of self-regulation is affected by many factors, but an important set comprises socialization influences. Several years ago researchers hypothesized that children' s exposure to socializing agents (e.g., models) influences their behavioral and cognitive development to include the acquisition of concepts, attitudes, preferences, and standards for self-reward and self-punishment (Bandura & Walters, 1963; Hartup, 1978; Mischel, 1968). Much research shows that children readily induce and transfer concepts that underlie modeling sequences (Bandura, 1986; Rosenthal & Zimmerman, 1978; Zimmerman & Rosenthal, 1974).

In recent years, cognitive theorists have shifted their attention to the process whereby self-regulatory competence is internalized and have studied how children arid adolescents learn to function independently from socializing agents in an adaptive, generative, and creative manner (Bandura, 1986; Como, 1989; Fuson, 1979; Kopp, 1982; Mithaug, 1993; Paris & Newman, 1990; Vygotsky, 1978; Wertsch, 1979; Zimmerman, in press). In this article we identify and review research on the social origins of students' development of self-regulatory skill with special emphasis on observational learning through *modeling.* Modeling occurs when observers pattern their behaviors, strategies, thoughts, beliefs, and affects after those of one or more models (Schunk, 1987). Recent research has demonstrated the effectiveness of modeling self-regulatory skills as a means of promoting students' academic achievement and associated *self-efficacy* beliefs (Schunk & Zimmerman, 1994). Researchers hypothesize that self-efficacy, or personal beliefs about one's capabilities to learn or perform

behaviors at designated levels (Bandura, 1986, 1997), is an important cognitive mechanism that mediates the relation of social (observational) influences and adaptive self-regulatory functioning (Schenk, 1994).

We initially present a theoretical overview of self-regulation from the particular perspective of social cognitive theory. We focus on the roles played by two constructs that are intimately linked with this theoretical perspective and that have been rigorously investigated by researchers in this tradition—modeling and self-efficacy. Although these constructs have been discussed in the context of other theories (Kopp, 1982; Paris & Newman, 1990), a unique contribution of social cognitive theory is that it highlights their contributions by explicating them in detail to include careful empirical research methods. We then describe a social cognitive phase model of the development of self-regulatory competence, and we compare that perspective to some other prominent views relating to the development of self-regulation. Research on modeling and self-efficacy processes is summarized, and we conclude with suggestions for future research in educational settings.

THEORETICAL BACKGROUND

Social Cognitive Theory of Self-Regulation

Bandura's (1986) social cognitive theory views human functioning as a series of reciprocal interactions between behavioral, environmental, and personal variables (e.g., cognitions, affects). For example, research shows that self-efficacy beliefs (personal variable) influence achievement behaviors (choice of tasks, effort, persistence) in that efficacious students are more likely to choose to engage in tasks, expend effort, and persist to overcome obstacles and succeed (Schunk, 1996a; Zimmerman, 1995b). Conversely, behaviors influence personal variables. As students work on tasks (behavior) they mentally note their progress (personal variable), which conveys to them that they are capable of learning, thereby raising their self-efficacy (Schunk, 1989).

An example of the influence of environment on behavior occurs when teachers introduce an unusual stimulus or novel event (environmental variable) and students direct their attention toward it (behavior). Behavior can affect environment. For example, if students act puzzled by a teacher's explanation (behavior), the teacher may reteach the material (environmental variable).

Personal variables and environments also affect one another. For example, when students with high self-efficacy find themselves trying to accomplish an academic task in an environment full of distractions (e.g., noise, others working), they may redouble their mental concentration (personal variable) to make the environment less distracting. Related views of self-regulation discuss this type of personal influence under the headings of *volitional control* (Como & Kanfer, 1993) and *proximal resource allocation* (Kanfer & Ackerman, 1989). The influence of environmental variables on personal variables is seen when teachers give students verbal feedback (environmental variable; e.g., "That's right. You're really getting good at this."), which raises their self-efficacy—a personal variable.

Social cognitive theory postulates that the self-regulation process comprises three major levels (subprocesses): self-ob servation, self-judgment, and self-reaction (Bandura, 1986; Kanfer & Gaelick, 1986). *Self-observation* refers to deliberate attention to specific aspects of one's behavior (Bandura, 1986). Bandura and others (e.g., Mace, Belfiore, & Shea, 1989) recommend assessing behaviors on dimensions such as quantity, quality, rate, and originality. When self-observation results in perceptions of goal progress, it can motivate one to improve (Schunk, 1989). Students with academic problems often are surprised to learn that they waste much valuable study time on nonacademic tasks. Such knowledge can motivate students to improve their habits. Self-observation is assisted with the use of *self-recording,* where instances of behavior are recorded along with their time, place, and frequency of occurrence (Mace et al., 1989).

Self-observation is closely linked to *self-judgment,* which refers to comparing current performance with a standard. Bandura (1986) places much emphasis on judgmental processes and on specifying factors affecting judgments, which has facilitated empirical investigation. Thus, self-judgments are hypothesized to be affected by type and importance of standards employed. Standards may be stated in absolute or normative terms. Absolute standards are fixed (e.g., a student who attempts to finish an assignment during a class period),

whereas normative standards are based on the performances of others (e.g., a student who attempts to be the first one in the class to finish an assignment). Standards often are acquired by observing models (Bandura, 1986); socially comparing one's perfornninces with those of others helps one evaluate the appropriateness of behavior. Social comparisons are used in the self-judgment process when absolute standards are not in effect or are unclear (Schunk, 1996a).

Self-judgments are also affected by the importance and informativeness of standards. People are more likely to judge their task progress for tasks they value. They may not assess their performance or expend effort to improve their skills for tasks in which they have little interest in how they perform.

Comparing one's performance against standards provides information about progress. Students who must learn 30 new spelling words in a week know they are ahead of schedule if they learn 10 words the first day.

Self reaction involves making evaluative responses to judgments of one's performance; for example, whether it is good or bad, acceptable or not acceptable, beyond or below expectation. These evaluative reactions constitute a critical aspect of self-regulation and represent a unique contribution of social cognitive theory (Bandura, 1986). Evaluative reactions involve students' beliefs about their progress. The belief that one is making acceptable progress toward a goal, along with the expected satisfaction of goal attainment, enhances self-efficacy and sustains motivation (Schunk, 1996a). Negative evaluations will not decrease motivation if students believe they are capable of improving (e.g., by working harder or using more effective strategies). Motivation is not enhanced if students think they lack the capability to succeed and that increased effort or better use of strategies will not help (Schunk, 1994). Self-reactions can be influenced by tangible self-rewards, which validate perceptions of progress and raise self-efficacy when they are linked to actual accomplishments. For example, students who believe they are improving their study routine may reward themselves by taking a break to watch a movie.

These three self-regulatory subprocesses interact with one another. As students observe their own performances, they judge them against goal standards and react to those judgments. Their evaluations and reactions set the stage for additional observations. These subprocesses also interact with environmental factors (Zimmerman, 1989). Students who judge their task progress as inadequate may react by requesting teacher assistance. Teachers may help students learn a better strategy, which students then use to produce better learning. This dynamic interaction of aspects of self-regulation is one of its central features (Schunk & Zimmerman, 1994).

Modeling Processes

Modeling often is an antecedent of self-regulation. An important contribution of social cognitive theory is to show that modeling can serve different imitative functions: inhibition/disinhibition, response facilitation, and observational learning (Bandura, 1986). *Inhibition/disinhibition* refers to the strengthening or weakening of behavioral inhibitions that occurs as a result of observing models. For example, students who are afraid of math and observe models engage in math activities without negative consequences may experience less fear and try the activities themselves (Zimmerman & Kindsler, 1979). Conversely, students who observe peers punished for classroom misbehavior may be less likely to misbehave.

Response facilitation occurs when modeled actions serve to socially prompt behavior by observers. New students in a class are likely to follow along and perform actions comparable to those of classmates as a means of learning the rules and routines. Modeling even has been shown to induce greater creative fluency among observing students (Zimmerman & Dialessi, 1973).

Observational learning through modeling occurs when observers display new behaviors that prior to modeling had no probability of occurrence, even with motivational inducements in effect (Bandura, 1986; Schunk, 1987; Zimmerman & Rosenthal, 1974). To learn observationally, students must attend to a model, code the information for retention, be capable of producing the demonstrated responses, and be motivated to perform the modeled behaviors (Bandura, 1986). An important form of observational learning occurs through *cognitive*

modeling, which incorporates modeled explanations and demonstrations with verbalizations of the model's thoughts and reasons for performing the actions (Meichenbaum, 1977).

Exposure to models is informative. Observer modeling is strongly affected by the *functional value* of behavior—whether modeled behaviors result in success or failure, reward or punishment. Modeled behaviors that lead to rewarding outcomes are more likely to be performed than behaviors that result in punishment (Zimmerman & Koussa, 1979).

Modeled (vicarious) consequences also indicate the *motivational value* of behavior to observers (Bandura, 1986). By observing modeled behaviors and their consequences, people formulate outcome expectations about the likely outcomes of actions. These expectations motivate behavior (Zimmerman, 1977).

Perceived similarity between model and observer is hypothesized to be an important source of information to determine behavioral appropriateness and formulate outcome expectations (Schunk, 1987). Most social situations are structured so that the appropriateness of behaviors depends on factors such as age, gender, or status. Although exceptions exist, the more alike observers are to models, the greater the probability that similar actions by observers are socially appropriate and will produce comparable results (Zimmerman & Koussa, 1975). Similarity is especially influential when observers have little information about the functional value of behaviors. This is not intended to downplay the importance of diversity: People learn from models who are unlike themselves in many attributes. Societal norms are such, however, that similarity in critical attributes is highly predictive of appropriateness for many behaviors (Bandura, 1986).

The effects of modeled consequences on observers depend in part on self-efficacy. Similarity to models constitutes an important source of vicarious information for gauging one's efficacy. Observing similar others succeed can raise observers' efficacy and motivate them to try the task because they may believe that if others can succeed they can as well. When similar others experience difficulty, observers may doubt their capabilities and may not be motivated to try the task. Similarity can have profound effects in situations where individuals have experienced difficulties and hold doubts about performing well (Schunk, 1987).

In the current view, models are important sources for conveying self-regulatory skills and for building their self-efficacy to employ these skills effectively on their own. The academic self-regulatory skills mentioned at the outset of this article are amenable to transmission by social models: planning and managing time; attending to and concentrating on instruction; organizing, rehearsing, and coding information strategically; establishing a productive work environment; and using social resources. For example, students might observe a teacher engage in effective time management and verbalize appropriate principles. By observing models, students may believe that they also can plan and manage time effectively, which creates a sense of self-efficacy for academic self-regulation and motivates students to engage in these activities.

Self-Efficacy

Self-efficacy is hypothesized to influence choice of tasks, effort expenditure, persistence, and achievement (Bandura, 1986, 1997; Schunk, 1996a; Zimmerman, 1995b). Compared with students who doubt their learning capabilities, those with high self-efficacy for acquiring a skill or performing a task participate more readily, work harder, persist longer when they encounter difficulties, and achieve at a higher level.

Learners obtain information about their self-efficacy from their performance accomplishments, vicarious (observational) experiences, forms of persuasion, and physiological reactions. Students' own performances offer reliable guides for assessing self-efficacy. Successes raise efficacy and failures lower it (Zimmerman & Ringle, 1981). Students socially acquire efficacy information by comparing their performances with those of others. Similar others offer a valid basis for comparison (Schunk, 1987). Observing similar peers succeed (or fail) at a task may raise (or lower) observers' self-efficacy, The effects of such vicariously induced changes in self-efficacy can be negated by observers' subsequent performance outcomes (e.g., observers fail to perform the task after they view successful models).

Learners often receive from teachers, parents, coaches, and peers persuasive information that they are capable of performing a task (e.g., "You can do this."). Such information can raise efficacy but can lose its influence from subsequent performance failure (Bandura, 1997). Students also acquire efficacy information from physiological reactions (e.g., sweating, heart rate). Symptoms signaling anxiety may convey that one lacks skill; lower anxiety may be construed as a sign of greater competency. It should be noted that sources may offer conflicting information; for example, a teacher gives positive feedback, but a student feels highly anxious. We cannot always predict which source will have the strongest effect on efficacy; it may depend on factors such as prior experiences, source credibility, and motivational influences (e.g., peer pressure).

Self-efficacy is an important influence on achievement behavior but not the only one. High self-efficacy will not produce competent performances when requisite knowledge and skills are lacking, *Outcome expectations* are influential because students engage in activities they believe will lead to positive outcomes (Shell, Murphy, & Bruning, 1989). *Per ceived value—the* perceived importance of learning, or what use will be made of what one learns—affects behavior because learners show little interest in activities they do not value. Assuming, then, that students possess adequate skill, hold positive outcome expectations, and value what they are learning, self-efficacy is hypothesized to exert an important effect on the instigation, direction, and persistence of achievement behavior.

Effective self-regulation depends on feeling self-efficacious for using skills to achieve mastery (Bandura, 1986, 1997; Bouffard-Bouchard, Parent, & Larivee, 1991; Schunk, 1996a; Zimmerman, 1989). As students work on a task, they compare their performances to their goals. Self-evaluations of progress enhance self-efficacy and maintain motivation to improve. Students who feel efficacious about learning or performing well are apt to implement effective self-regulatory strategies, such as concentrating on the task, using proper procedures, managing time effectively, seeking assistance as necessary, and monitoring performance and adjusting strategies as needed (McCombs, 1989; Pintrich & De Groot, 1990; Zimmerman, 1994). The latter self-regulatory strategies are types of *volitional processes* (Corno, 1993) because they involve task and self-management rather than personal appraisals of efficacy.

Although low self-efficacy is detrimental, effective selfregulation does not require that self-efficacy be exceptionally high. Salomon (1984) found that a slightly lower sense of self-efficacy led to greater mental effort and better learning than did extreme confidence. There is a limit, however; a very low sense of efficacy does not motivate. Assuming that learners feel efficacious about surmounting problems, holding some doubt about success may mobilize effort and effective use of strategies more than does feeling overly confident.

TABLE 1
A Social Cognitive Analysis of Influences on Students' Self-Regulatory Development

Levels of Development	*Social Influences*	*Self-Influences*
Observational	Models Verbal description	
Imitative	Social guidance and feedback	
Self-controlled		Internal standards, Self-reinforcement
Self-regulated		Self-regulatory processes, Self-efficacy beliefs

Development of Self-Regulatory Competence

Zimmerman and Bonner (in press) advanced a social cognitive theoretical model of the development of self-regulatory competence (Table 1). The model predicts that academic competence develops initially from social sources and subsequently shifts to self sources in a series of levels. Novice learners acquire self-regulatory skills and strategies most rapidly from social modeling, tuition, task structuring, and encouragement (Zimmerman & Rosenthal, 1974). Although many learners can induce the major features of strategies from watching a model *(observational level* of academic skill), most of them will benefit from actually performing the strategies to help incorporate them into their behavioral repertoires. If a model adopts a teaching role and provides guidance, feedback, and social reinforcement during practice, he or she can improve the observer's behavioral accuracy of

the skill portrayed (i.e., cognitive, motor, social). During *participant* or *mastery modeling* (Bandura, 1986), the model repeats selected aspects of the strategy and guides enactment based on the learners' imitative accuracy. The primary source of motivation during this phase is vicarious reinforcement. Successful models and their methods are emulated; unsuccessful ones are avoided.

An imitative level of self-regulatory competence is attained when the learner's performance approximates the general form of the model. The observer is not copying the exact actions of the model; rather, the learner emulates the model's general pattern or style of functioning. For example, the learner may imitate the type of question a model asks but not duplicate the model's precise wording (Zimmerman & Rosenthal, 1974). The distinction between the observational level and the imitative level of self-regulatory skill and the sequential dependence of the latter on the former stems from the early social cognitive research separating cognitive acquisition from motoric performance. Bandura (1965) showed that what is learned vicariously is riot necessarily manifested in imitative responses unless the student possesses the requisite motoric skill and motivation. Socially reinforced motoric practice was found to be important in developing imitative accuracy (Bandura, 1977). Recent research has revealed that students trained to discriminate essential qualitative features of a modeled novel speech form cognitively displayed not only faster imitative learning of the speech skill but also greater self-efficacy about their learning progress than untrained counterparts (Ellis, 1995).

The source of learning of self-regulatory skill is primarily social for the first two levels of academic competence; most research summarized in this article addresses social influences. At more advanced stages, the locus shifts to self sources. We discuss some higher level research, but we refer readers to Schunk and Zimmerman (1996) for a thorough discussion of research at the self level.

The most apparent manifestation of the third, self-controlled level of academic self-regulatory skill, is the capability of learners to use the strategy independently when performing transfer tasks. Students' use of a self-regulatory strategy becomes internalized during this phase, but it remains dependent on representational standards of a model's performance (i.e., covert images and verbal meanings) and the self-reinforcement that stems from behaviorally matching these representations (Bandura & Jeffery, 1973).

A higher level of self-functioning is needed to deal with more complex situations. The fourth, self-regulated level of self-regulatory skill, allows learners to systematically adapt their learning strategies to changing personal and contextual conditions (Bandura, 1986). At this level of competence, the learner can initiate use of strategies, incorporate adjustments based on contextual features of the situation, and maintain motivation by self-efficacy perceptions of enactive success. The learner chooses when to use a strategy and varies its features self-regulatively with little or no residual dependence on the model during this phase. Although this self-regulated level of functioning emerges from specific social learning experiences, it depends in part on children's overall cognitive and motoric development.

This four-level analysis of the development of self-regulatory competence begins with acquiring knowledge of learning skills (observation) and includes using these skills (imitation), internalizing them (self-control), and employing them adaptively (self-regulation). The primary source of motivation also shifts from social to self-regulated sources: Vicarious, reinforcement assumes prominence during observation, direct reinforcement during imitation, self-reinforcement during the self-control phase, and self-efficacy beliefs during the self-regulatory phase. Although a developmental progression occurs from social to self-influences, it is assumed that personal self-regulatory influences (e.g., self-efficacy, metacognition, and affect) remain reciprocally interdependent with social—environmental and behavioral triadic influences (Zimmerman, 1989). Self-regulation does not imply a person's obliviousness to social influences but rather his or her intentional, self-observant use of these social forces. Consider the example of expert tennis players who self-select personal coaches to work on developing effective court strategies and on keeping mechanical flaws from entering their game. These self-regulated players rely on their athletic expertise to choose valuable social assistance. In similar fashion, students who self-regulate their academic learning have been found to seek help strategically (Newman, 1994; Zimmerman & Martinez-Pons, 1986).

Social cognitive researchers view self-regulation as a domain-specific level of acquired skill that depends on several task-dependent processes, such as planning, strategizing, developing motoric proficiency, and self-monitoring. For example, students' competence to self-monitor and self-adjust their academic writing usually differs from the same self-regulatory competencies in mathematical reasoning or performing a sport. These task-dependent processes allow this phase or level perspective to explain specific forms of skill development beyond children's initial ability to self-adjust their performance to common tasks, such as older students' and adults' expert mastery of specialized skills (Zimmerman & Kitsantas, 1996, 1997).

This phase formulation of self-regulatory development differs from stage conceptualizations by its emphasis on an optimal sequence of social learning interactions rather than on an invariant sequence of age-related personal traits or cognitive stages. According to this phase model, learning is optimized when the needed form of social instruction is matched to the students' level of regulatory skill on the task in question. Either premature or delayed reliance on self-regulatory processes can retard the speed of learning and the ultimate degree of achievement (Zimmerman & Kitsantas, 1997). Most coaches can tell stories of strong-willed students who have resisted instructional advice and shifted to self-directed practice before they were ready.

Not only may students shift their instructional phase inappropriately, they may attempt to skip some phases entirely. For example, a student may not have access to an exemplary model to learn a skill or may choose to develop the skill on his or her own. He or she would, in essence, miss the first three stages and try to begin at a self-regulatory level. This trial-and-error approach to skill development fails to build on social cultural advances in learning and generally reduces the speed and amount of learning for most complex skills because it presupposes underlying self-regulatory processes, such as effective strategies and self-monitoring. A social cognitive phase model of self-regulatory development also assumes that learners may need to recycle through earlier instructional phases periodically because of slumps, ruts, or setbacks. For example, several professional golfers have gone back to prior coaches when they lost control of some aspect of their game.

What develops is students' capability to learn and perform a specific task effectively under decreasing levels of social–instructional support. Although increases in the use and quality of self-regulatory processes and reliance on internalized forms of motivation are expected to improve one's effectiveness, other factors affect performance outcomes as well, such as mental and physical abilities. A child with a learning disability may need to engage in high levels of self-regulation to read at his or her grade level. Factor analytic research (Zimmerman & Martinez-Pons, 1988) has shown that academic self-regulatory skill is distinctive from but correlated with indices of both ability and achievement. Thus, achievement is a confounded index of self-regulatory skill. To determine students' phase level of self-regulatory development, testing their domain-specific skill under varying circumstances of social support is necessary.

The purpose of a social cognitive phase model is not to classify learners on an invariant progression of mutually exclusive stages. Rather, it is to guide social–instructional experiences to enhance students' development of self-regulatory processes during specific learning episodes. Learning is optimized when social parameters of instruction are matched to the student's phase of regulatory development, and development is optimized when learning episodes socially convey the processes needed to personally regulate at the next phase level. Students internalize more than an academic skill from these social learning episodes; they acquire the tools for further learning the skill more effectively on their own, such as how to self-monitor and self-adjust their study efforts. Self-regulatory development is a dynamic sequence of inter-to intrapersonal shifts rather than an unidirectional age-related progression of mutually exclusive stages. Unlike nativist stage theories that assume development constrains learning (e.g., Piaget, 1970), a social cognitive phase model seeks to describe how learning and self-regulatory development are reciprocally beneficial (Zimmerman, 1995a).

RELATED VIEWS

Although this article focuses on social cognitive theory, other theoretical perspectives address the development of self-regulation. Our purpose is not to provide a complete review of applicable self-regulation theories; an extensive discussion would alter the article's focus and extend beyond its intended scope. Rather, we discuss

two well-known and often-cited perspectives bearing on the development of self-regulation: sociocultural theory and self-determination theory.

Sociocultural Theory

Vygotsky (1962, 1978) suggested that children's self-regulatory activities grow from social interactions between adults or more mature peers and learners in four stages. He observed that adults provide support within children's *zone of proximal development* on tasks they cannot perform by themselves. The adults and children collaborate to complete tasks, and social dialogue between them helps develop children's self-directive speech, which is believed to be the source of self-regulatory control.

In the first stage, infants respond reflexively to the environment in stimulus–response fashion on the basis of a preprogrammed nervous system. Adults regulate infants' behavior by controlling immediate stimuli in the environment using signs—especially speech cues. During the second stage, toddlers begin to mediate behavioral responding using external signs as an aid, but these youngsters have mastered only concrete, external connections between signs and stimuli. They begin to use signs in order to influence other people around them. During the third stage, young children can regulate their own behavior by actively organizing their stimulus fields to achieve desired responses. Signs—particularly speech—become internalized during this stage, and youngsters manipulate them to carry out behavioral operations. The word as a sign of socially shared meaning becomes the most useful tool in young children's attempts to master their environment Finally, during the fourth stage, external relations among stimuli, signs, and behavior become fully internalized. During, this self-regulated phase, children begin to function without the aid of external signs because basic processes have been transformed linguistically into tools for planning and guiding cognitive and behavioral activities.

Vygotsky viewed self-regulation as a generalized trait or stage of competence that children develop by the early elementary school grades when self-directive speech is believed to become covert, but one should note that many contemporary instructional adaptations of Vygotsky' s theory no longer adhere to this generalized stage assumption (Gallimore & Tharp, 1990). Perhaps because Vygotsky sought to explain self-regulatory competence but not performance, he said little about what motivates self-regulatory activity except that children will be motivated when learning activities are embedded in a social system involving joint participation in learning with peers or teachers (Henderson & Cunningham, 1994). When teaching self-regulation, Vygotsky emphasized the role of verbal intersubjectivity between adults and children as the primary source of children's internalization of self-directed speech. Reciprocal teaching involving verbal elaboration and explanation between adults and children is perceived as better for self-regulatory development than direct verbal modeling, which is assumed to produce passive compliance (Diaz, Neal, & Amaya-Williams, 1990).

Like Vygotsky, social cognitive researchers emphasize the importance of socialization influences, but we stress the roles of other triadic learning processes besides self-verbalization. These include self-controlled practice of motoric elements, use of environmental resources, and reliance on additional personal processes, such as cognitive strategies, nonverbal imagery, and affect (Schunk, 1989; Zimmerman, 1989; Zimmerman & Risemberg, 1997). The Vygotskian assumption that modeling leads to passivity is questioned on the basis of extensive evidence that observational learning and imitation primarily elicit cognitively constructive processes rather than passive compliance or mimicry (Rosenthal & Zimmerman, 1978; Zimmerman & Rosenthal, 1974).

In contrast to Vygotsky' s generalized stage account of self-regulatory development, social cognitive researchers view self-regulation as a domain-specific level of skillful functioning. In addition to the development of task-related competence, a triadic account of self-regulation seeks to explain lapses in performance depending on adverse environmental, personal, or behavioral conditions, This multifaceted explanation for self-regulatory competence and performance considers both the developmental level and task-dependence of specific processes, such as strategy use and self-monitoring (e.g., Schunk & Swartz, 1993; Zimmerman & Kitsantas, 1996, 1997), as well as specific sources of motivation, such as self-reinforcement and self-efficacy beliefs. Because of these features, this developmental level formulation can address human functioning beyond

children's initial ability to self-adjust their performance—especially older children's and adults' expert competence and performance (Ericsson & Charness, 1994; Zimmerman, in press).

Self-Determination Theory

In the context of the theory of self-determination, Deci and colleagues (Deci & Ryan, 1991; Rigby, Deci, Patrick, & Ryan, 1992; Ryan, Connell, & Deci, 1985) discussed the process whereby extrinsic controls, rewards, and structures become internalized and integrated into the self-regulation system. This self-determination view is relevant to our perspective because it describes a multistage process of increasing self-regulation and involves external factors that initially are not part of children's self-regulatory processes but are motivational and help produce desirable social functioning.

The activities of interest are extrinsic in that they are not activities engaged in for their own sake (intrinsic) but rather are performed because of external controls, to obtain rewards, or to please others. *Internalization* is the process whereby individuals transform regulation by external events into regulation by internal factors (self-determination). This is an organismic process that involves children assimilating the socializing environment and accommodating to its demands (Ryan et al., 1985). According to self-determination theory, the origins of self-regulatory behavior lie in social factors that are not intrinsically (naturally) motivating.

Deci and associates describe a continuum of internalization. At the lowest level, external regulation, students perform (or do not perform) activities based on expected extrinsic contingencies (i.e., to obtain :rewards or avoid punishments). We find little self-determination, for example, when students work on a task to obtain teacher praise or to avoid criticism.

The next level, introjected regulation, involves contingently applied self-approval or self-disapproval. The source of motivation is internal (feelings of should, ought, guilt) to the student but not self-determined because the motivation seems to be controlling the student. Students display introjected regulation when they engage in an activity out of feelings of guilt (they will feel guilty if they do not perform it) or to avoid anxiety and self-disapproval that would accompany failure and feel better about themselves when they perform well (i.e., they are glad they did it).

At the third level, identified regulation, people engage in an activity because it is personally important to them. The regulation, which previously was extrinsic, is now viewed as one's own goal or value and thereby largely self-determined. Students display identified regulation when they study diligently to make good enough grades to be accepted by a university or when they spend extra hours working on cars to become skillful enough to obtain a mechanic's position. These goals have extrinsic utility value but they are personally meaningful to the students, although these are not the same as being intrinsically motivated.

In the final level of extrinsic motivation, integrated regulation, people integrate internal and external sources of information into their current identifications. Students engage in behavior because of its importance to their sense of self. One might have multiple goals (e.g., learn material and relate well to others) that do not necessarily interfere with one another. This represents a mature level of self-regulation that typically is attainable only in late adolescence (Ryan et al., 1985). Although this final level is still instrumental rather than reflecting intrinsic motivation, it represents a form of self-determination and autonomy (Pintrich & Schunk, 1996).

Unlike Vygotsky' s theory, the self-determination perspective focuses mainly on developmental changes in motivation from extrinsic to intrinsic sources but says relatively little about developmental changes in the self-regulation of learning. This perspective describes developmental shifts in why students learn but not in how students learn on their own. Like a social cognitive phase model, the self-determination view postulates a series of levels characterized by increasing self-motivation. We suggest that an optimal model of self-regulatory development needs to explain not only increasing self-motivation but also enhanced self-regulation of learning, such as children's increasing capability to set goals, concentrate, self-monitor, and use strategies on their own

(Bandura, 1986; Schunk, 1994; Zimmerman, 1994). Although Vygotsky' s theory could be used to explain cognitive features of self-regulatory development and self-determination theory could be used to describe motivational features, we suggest that an integrative explanation for both learning and motivational processes is preferable. Self-regulated learners are distinguished by their self-reliant methods of learning as well as their self-motivation (Zimmerman, 1989).

A social cognitive phase model seeks to describe how an optimal sequence of social learning episodes systematically reduces social instructional support and external sources of motivation as students become more self-regulatory and more self-motivated. A comprehensive account of self-regulatory development must describe the interaction between learning and motivation. For example, self-monitored changes in learning during the self-control and self-regulation phases enhance self-reinforcement and self-efficacy beliefs as well as provide feedback about the effectiveness of particular learning strategies. We believe that an integrative model of self-regulatory learning and motivational development is essential for guiding research and instructional applications.

RESEARCH EVIDENCE

This section presents a limited review of research on the social origins of self-regulatory competence. As shoWil in Table 1, social origins include models, verbal description, social guidance, and feedback. To further focus our review, we summarize primarily research on observational learning through modeling. Self-influences, which include factors such as self-instruction, personal goal setting, self-monitoring, self-evaluation, help seeking, and time management, extend beyond the scope of this article and are discussed in detail elsewhere (Bandura, 1986; Schunk & Zimmerman, 1996). One should note that social and self factors can interact and that self factors can be affected by influences in the social environment. For example, internal standards can be acquired through observations of models. In general, however, self influences depend less on the social environment than do the social influences.

Models and Verbal Description

Extensive literature exists on the role of modeling in social development (Rosenthal & Bandura, 1978). The topic has experienced renewed interest lately due to its relevance to educational processes such as peer collaboration, mentoring, and apprenticeships (Bailey, 1993; Cohen, 1994).

Models are important sources for the initial development of self-regulation--an observational level of self-regulatory competence. By observing models, students acquire knowledge and strategies that they subsequently apply as they work on tasks. Modeled actions also convey to observers that they can succeed if they follow the same sequence. Students who believe they know what to do to perform a task feel more efficacious about succeeding, and this sense of efficacy is increased as observers experience performance success (Schunk, 1987).

An important means of developing an observational, level of self-regulatory competence is through cognitive modeling (discussed earlier). Schunk (1981) gave children who had difficulty in mathematics either cognitive modeling or didactic instruction. In the modeling treatment children observed an adult model verbalize long--division solution steps while applying them to problems. The didactic treatment consisted of children reviewing instructional, pages that portrayed step-by-step solutions of division problems. Both cognitive modeling and didactic instruction led to significant increases in self-efficacy, skill learning, and persistence, but modeling resulted in significantly greater division skill learning compared with the didactic treatment. Results of a path analysis showed that self-efficacy exerted a direct effect on both persistence and learning.

Perceived similarity to models in important attributes can raise observers' self-efficacy and motivation when observers believe that if others can succeed they can as well (Schunk, 1987). One way to increase model—observer similarity may be with coping models, who initially demonstrate the typical problems and possibly fears of observers but gradually improve their performances and gain self-confidence. These models illustrate how effort and positive thoughts can overcome difficulties. Coping models contrast with mastery models, who

demonstrate faultless performance from the outset (Schunk, 1987). In the early phases of learning, many students may perceive themselves more similar in competence to coping models.

Schunk and Hanson (1985) determined the effects on children's achievement outcomes of peer mastery and coping models, adult models, and no models. Mastery models solved subtraction problems correctly and verbalized statements reflecting high self-efficacy and ability, low task difficulty, and positive attitudes. Coping models initially made errors and verbalized negative statements, but then verbalized coping statements (e.g., "I need to pay attention to what I'm doing.") and eventually verbalized and performed as well as mastery models. Mastery and coping models increased self-efficacy and subtraction achievement better than adult models or no models; adult-model children outperformed no-model students. Although adult models can teach students self-regulatory skills, students' self-efficacy for learning may be aided better by observation of similar peers. In turn, self-efficacy can sustain motivation for skill improvement.

The lack of differences between the coping and mastery model conditions may have arisen because children had previously experienced success with subtraction; thus, any type of peer model would have raised efficacy. Schunk, Hanson, and Cox (1987) further explored the coping-mastery model distinction and found that observing coping models enhances children's self-efficacy and skillful performance more than does observing mastery models. Unlike Schunk and Hanson (1985), Schunk et al. (1987) used a task (fractions) at which children had not previously been successful. Coping models may be more beneficial when students have little task familiarity or have encountered previous learning difficulties. Schunk et al. also showed that multiple models (coping or mastery) promote outcomes as well as a single coping model and better than a single mastery model. With multiple models, learners are apt to perceive themselves as similar to at least one model.

Models also can help to develop an observational level of self-regulatory competence by verbalizing and acting in accordance with abstract rules and concepts for self-regulation. For example, Bandura and Kupers (1964) showed children a model demonstrating stringent or lenient standards while playing a bowling game. Children exposed to high-standard models were more likely to reward themselves for high scores and less likely to reward themselves for low scores compared with individuals assigned to the low-standard condition. Davidson and Smith (1982) had children observe a superior adult, equal peer, or inferior younger child set stringent or lenient standards while performing a pursuit-rotor task. Children who observed a lenient model rewarded themselves for lower scores more than did children who observed a stringent model. Children's self-reward standards were lower than those displayed by the adult, equal to those portrayed by the peer, and higher than those demonstrated by the younger children. Age similarity may have led children to believe that the standards adopted by the peer were the most appropriate for them.

Models often provide social evaluative cues, feedback, and assistance to help observers achieve an imitation level of self-regulatory competence. France-Kaatrude and Smith (1985) had first and fourth graders perform a pursuit-rotor task and allowed children to compare their performances with a peer, of higher, equal, or lower competence. Relative to children offered social comparisons with superior or inferior peers, children who could compare with a similarly performing peer did so more often, displayed greater task persistence, and took fewer rewards.

Another effective, method of developing imitative competence is self-modeling, which involves observing one's own performances (Dowrick, 1983). In a typical study, participants are videotaped while performing a task and subsequently view their tapes. Tapes allow for review and are especially informative for tasks one cannot watch while performing (e.g., motor skills, social interactions). When performances contain errors, having a knowledgeable individual provide feedback during tape review helps to prevent performers (observers) from becoming discouraged. The expert can explain how to execute the behaviors better the next time. Tapes can convey to observers that they are becoming more skillful and will continue to make progress by employing effective self-regulatory strategies. These beliefs raise observers' self-efficacy for continued learning.

In support of these points, Schunk and Hanson (1989) videotaped children solving mathematical problems and showed them their tapes. Subsequent self-modeling benefits were obtained as these children displayed higher self-efficacy, motivation, and self-regulated strategy use than did children who had been taped but did not observe their tapes and children who had not been taped.

Teachers must fade social and instructional supports and encourage students to work on their own so that students may achieve an imitative level of competence. Fading can be done gradually as students abstract the underlying learning strategy and receive progress feedback.

Social Guidance and Feedback

Research by Schunk and Swartz (1993) illustrates how students can be guided from the imitative learning level to a self-controlled level of self-regulatory competence through social guidance and feedback. The context was instruction on paragraph writing with elementary-school children. Students received writing instruction from an adult model, who demonstrated application of a five-step writing strategy (e.g., choose a topic to write about, pick the main idea). Once children observed the model they received guided practice applying it to paragraphs (e.g., descriptive, narrative, informative). Eventually the guided practice shifted to independent practice where students worked on their own. Thus, the adult support initially present was gradually lessened as students gained imitative competence. Researchers expected that students who had attained a self-controlled level of competence would fare better if they were given a process (learning) goal rather than a product (performance) goal to guide their self-directed practice.

Four experimental conditions existed: process (learning) goal, process goal plus progress feedback, product (performance) goal, general (instructional control) goal. Process-goal and process-goal plus progress-feedback students received instructions at the start of each session that emphasized a goal of learning to use the strategy to write paragraphs. Product-goal students were told that their goal was to write paragraphs; general-goal children were advised to do their best. Other types of goals mentioned in the literature that are conceptually similar to process (learning) goals include mastery goals, task-involved goals, and task-focused goals (Ames, 1992; Butler, 1992; Meece, 1991; Nicholls, 1984; Wentzel, 1992); synonyms for product (performance) goals include ego-involved goals and ability-focused goals.

Children assigned to the process-goal plus progress-feedback condition periodically received social (verbal) feedback from the adult model that linked their use of the strategy with improved writing performance (e.g., "You're doing well because you followed the steps in order."). Feedback was given contingent on students using the strategy properly. Schunk and Swartz felt that in a subject such as writing, progress often is difficult to gauge on one's own; thus, the feedback would inform students of their learning progress and raise self-efficacy and motivation.

The process-goal plus feedback condition was the most effective and some benefits of the process goal alone also occurred. Process-goal plus feedback students generally outperformed product- and general-goal students on self-efficacy and writing skill. The former students also demonstrated the greatest amount of strategy use while writing paragraphs. Gains made by process-goal plus feedback students were maintained after 6 weeks and generalized to types of paragraphs on which students had received no instruction.

Graham and Harris (1989a, 1989b; Sawyer, Graham, & Harris, 1992) showed that teaching students with learning disabilities a strategy for writing essays or stories improves their self-efficacy and writing performance and that gains are maintained after instruction and generalize to other settings and content. A cognitive modeling procedure was used in which models explained and demonstrated the strategy while applying its steps to write stories. Models also conveyed to students the value of strategy use by providing feedback emphasizing that strategy use would help students attain their learning goals. Other components of the procedure were self-monitoring of writing performance and self-evaluation of progress by comparing goals with achievement.

Recently, the effectiveness of process goals during self-directed learning was compared with that of product goals without any external social feedback. Zimmerman and Kitsantas (1996) worked with high-school girls learning the novel athletic skill of dart throwing. All of the girls in the experimental groups were given strategy training and then were asked to practice on their own. Some girls were asked to set a process goal and concentrate on executing the strategy (e.g., sighting, throwing, follow through) as they practiced the skill, whereas others were asked to set a product (e.g., outcome) goal of trying to get the most points as they practiced. The results showed that girls given a process goal surpassed those given a product goal in dart-throwing skill, self-efficacy beliefs, self-reactions (rated satisfaction), and intrinsic interest in dart throwing relative to other sports.

These results suggest that as strategic performing is being internalized, process goals enhance learning better than product goals. However, after internalized self-control is attained, product goals may enhance learning better, and this hypothesis was tested in research. Zimmerman and Kitsantas (1997) found that after a dart-throwing strategy was fully internalized (i.e., the strategy was performed flawlessly), product goals were highly effective in guiding self-directed practice. High-school girls given product goals surpassed those given process goals in dart-throwing accuracy, self-efficacy beliefs, self-evaluative reactions, and intrinsic motivation.

FUTURE RESEARCH DIRECTIONS

This article suggests that students' self-regulation of learning develops from initial social modeling experiences and progresses through increasing levels of self-directed functioning. We have described some research results that support the importance of modeling and self-efficacy in this formulation. More research is necessary on the role of models, as well as on the other social origins of verbal description, social guidance, and feedback. Most of the existing research has been done outside of the regular classroom context, so work is especially needed in actual classrooms. In this section we suggest three areas where we believe future research is needed to clarify and refine the hypothesized operation of social origins of the development of self-regulatory competence.

Peer-Assisted Learning

Teachers commonly make use of models in the classroom, but theory and research suggest that the particular use of models who demonstrate the cognitive skills and strategies of self-regulation is important. Research shows that teachers who model strategies and verbalize their thought processes as they perform tasks can help develop self-regulatory competencies (Graham & Harris, 1989a, 1989b; Palincsar & Brown, 1984; Sawyer et al., 1992).

We advocate greater research on the role of peer-assisted learning, which takes many forms including tutoring, mentoring, cooperative groups, peer trainers, peer counseling, peer assessment, and reciprocal teaching. We discuss two of these: cooperative groups and peer trainers.

In cooperative groups, a small number of students work jointly on a task that is structured so that each group member has some responsibility (Cohen, 1994). Groups typically are arranged in such a fashion that each member is required to master the skills and the group does not proceed until the skill is mastered. That students serve as models for one another is essential. For example, each student might work on some aspect of the task and then explain and demonstrate the skill to other group members after he or she has mastered it. These peer models teach skills and raise observers' self-efficacy for learning (Schunk, 1987).

Much has been written on the benefits of cooperative groups for student learning and achievement beliefs. A wealth of research shows their effectiveness compared with more traditional forms of instruction (Johnson & Johnson, 1985; Slavin, 1983, 1995). Less is known, however, on how the various components of cooperative arrangements exert their effects and on the extent that groups can help develop members' self-regulatory skills.

Research is needed on the dynamics of cooperative groups as they work on tasks requiring self-regulatory functions such as setting goals, planning and organizing tasks, monitoring and evaluating progress, and making

decisions. This type of research may require extensive naturalistic observations of groups over long periods, but the data would provide rich information on what types of models operate best in the setting.

In using peer trainers, a teacher initially trains one or more students to demonstrate skills and how to teach these to other students. Peer trainers have been used successfully to teach social skills, where trainers initiate social interactions with socially withdrawn children by using verbal signals (e.g., "Let's play blocks.") and motor responses (e.g., handing the child a toy; Strain, Kerr, & Ragland, 1981). Research is needed that broadens the peer trainer's role to include self-regulatory skills; for example, trainers who assist other students in setting goals, prioritizing task assignments, and monitoring progress in learning.

Transfer

A second area of research we recommend is on factors affecting transfer of self-regulatory skills. Transfer includes maintenance of skills over time and generalization across contexts and subject domains. Transfer is important because self-regulation is involved in the academic, social, and motor skill domains.

Theory and research suggest that transfer is not automatic and that a variety of factors affect it. Factors that have been shown to be important include possessing the requisite skill; understanding when and where the knowledge, skills, or strategies may be useful; knowing how to modify applications of skills or strategies to fit different settings and content; having the opportunity to practice with new material; and believing that the skill or strategy is useful with the new content or in the new setting (Borkowski & Cavanaugh, 1979; Pressley et al., 1990; Salomon & Perkins, 1989; Schunk, 1994).

Transfer has been an important topic in the history of learning and is addressed by many learning theories (Schunk, 1996b). Much research has explored mechanisms of transfer including recognizing common features between situations, linking of knowledge in memory, and understanding the value of the skill or strategy in different contexts. We suggest that modeling and self-efficacy influence transfer, and we advocate increased research emphasis on the transfer of self-regulatory skills.

Researchers interested in this topic might consider Phye's (1989, 1990) model for enhancing transfer. During the acquisition phase, learners receive instruction and practice including assessment of their awareness of uses of the strategy. The retention phase includes more practice on training materials and recall measures. The transfer phase occurs when students attempt to solve new problems that have different surface characteristics but that require the same strategy practiced during instruction. Phye also emphasizes the role of motivation for transfer and ways to boost motivation by highlighting uses of knowledge and strategies to learners.

In this view, modeling is important for enhancing acquisition and motivation, and also can help provide corrective or supplementary instruction during retention and transfer. We might investigate what features of modeled displays are most important for transfer. Thus, verbalizing applicability of a strategy to different situations may prove useful, as might coping statements designed to raise self-efficacy (e.g., "I think I can use this same strategy to solve this problem. Let me think about how to apply it."). We also can determine where transfer occurs in our levels of self-regulation; for example, are verbal descriptions adequate or do learners require the more intensive feedback that typically occurs at the imitative level?

Teacher Control of Instruction

A third area where we recommend research concerns the extent that learners benefit from structured experiences that include a high degree of teacher control over instruction. We suggest that social learning experiences can be planned and organized by teachers and parents to accelerate children's self-regulatory development. Although widespread agreement exists about the importance of self-regulatory processes in students' learning, not everyone shares our advocacy. Gardner (1991), for example, proposed a development learning model that parallels the type of natural, spontaneous learning that young children engage in, particularly before they enter school. Learning is a constructive process in which children develop their own understandings of the world based on their interactions with it by searching for, choosing, and processing

information on their own. Learning is most meaningful when it is situated within contexts. Teachers are not conveyors of instruction but rather establish rich environments and provide for social guidance and apprenticeships. Intrinsic motivation in learning is sustained through active participation in learning and perceptions of progress and competence.

The approach we advocate shares many features with that Gardner (1991) espouses including the emphasis on social guidance, apprenticeships (which use mastery models), self-perceptions of progress, and self-evaluations of competence. At the same time, we place greater emphasis on the role of structured experiences to foster development of self-regulatory skills. Evidence shows that self-organized learning without teacher guidance can lead to substantial deficits in students' knowledge (Brown & Van Lehn, 1982; Weinert & Helmke, 1995).

Weinert and Helmke discuss several advantages of teacher-controlled instruction including maintaining a strong academic focus, minimizing classroom disruptions, diagnosing and remedying academic problems, and ensuring student learning progress and achievement. These authors contend that learning goals must be considered when designing instruction. If the goal is to help students become independent thinkers (e.g., problem solvers), then methods that encourage this should be implemented; conversely, if the goal is to ensure knowledge acquisition and achievement (e.g., basic skills), then greater teacher control of instruction is desirable.

Additionally, situating learning within contexts is not necessarily best. How closely learning is tied to a particular context should depend on the type of knowledge, skill, or strategy to be acquired (Anderson, Reder, & Simon, 1996). As Anderson et at exemplify, arithmetic carrying is bound to the context of base-10 addition and will not generalize to another base system. Conversely, reading is not as context bound. To the extent that self-regulatory skills can be taught in different domains, we do not recommend that all learning be contextually situated.

CONCLUSION

A social cognitive view of self-regulatory development offers several distinctive features that are important in explaining existing evidence regarding students' academic self-regulation. First, it describes how self-regulatory skill and a sense of self-efficacy grow out of specific social learning instructional experiences, including modeling and socially reinforced attempts to imitate as well as self-controlled study or practice efforts. Second, a phase model of self-regulatory development describes shifts in students' methods of learning and sources of personal motivation. Existing developmental formulations, such as Vygotsky's theory and self-determination theory, focus on either learning or motivation but not the interaction of these two key dimensions of self-regulation (Bandura, 1986, in press; Pintrich & Schunk, 1996; Schunk, 1996b; Zimmerman, 1994). The ultimate development of students' academic self-regulatory skill depends on the growing synergy between their use of self-regulated learning processes and derived forms of self-motivation, such as perceived self-efficacy. A social cognitive phase model provides the conceptual and empirical basis for systematically developing both the learning processes and motivational beliefs that define self-regulated learners.

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