One can predict that in a few more years, millions of school children will have access to what Phillip of Macedon’s son Alexander enjoyed as a royal prerogative: the personal services of a tutor as well-informed and responsible as Aristotle.

—Suppes (1966, p. 207)

As Suppes (1966) notes, for thousands of years, there has been general agreement about the most effective means of teaching children, namely, the individual tutorial. From the ancient Greeks and Romans through the Age of Enlightenment, the children of the rich and powerful (and any others lucky enough to receive any formal instruction) were educated by professional tutors. Even in the midst of the heated debates about the nature of children that characterized 17th- and 18th-century Europe, thinkers as diverse in their
philosophies as Locke, Hobbes, and Rousseau all agreed on the unsurpassed efficacy of individual tutoring.

Today, as we enter the 21st century, tutoring remains the ideal, the gold standard as it were, of education. In one particularly prominent review of the literature, for example, Benjamin Bloom (1984) documented the major gains in performance that typically result from one-on-one tutoring and suggested that the central task for educational researchers remains the search for other, it is hoped, more practical and cost-effective, instructional techniques that might produce effects on student learning and motivation as powerful as those of personal tutelage. Indeed, even programs in which slightly older students are asked to serve as personal tutors for their younger schoolmates appear to produce substantial gains in both learning and motivation (e.g., Levin, Glass, & Meister, 1984).

At the same time, despite its obvious effectiveness, tutoring has received, until very recently, surprisingly little experimental attention (Wood, Bruner, & Ross, 1976). Presumably, the lack of research interest in tutoring is primarily the result of its high cost, at least as compared with traditional group-oriented instructional methods where single teachers are responsible for teaching 30 or more students. In most public schools, individual tutoring remains a luxury and a rarity. Even today, it is primarily the children of the well-to-do who are able to benefit from individual tutoring, which is paid for by their families, along with a much smaller number of less-advantaged children identified by their schools as requiring exceptional levels of assistance, who receive some individualized instruction as part of various targeted remediation programs (e.g., Clay, 1991; Slavin, Madden, Dolan, & Wasik, 1996).

In the past 10 to 20 years, however, a number of researchers have begun to investigate the process, and not just the results, of tutoring—to examine what makes tutoring such an effective instructional technique. Interestingly, this recent interest has stemmed in large part from the advent of powerful personal computers with the potential, as Suppes had noted in the earliest days of computing, to provide a cost-effective means of providing each child with an individual tutor (e.g., Lajoie & Derry, 1993; Larkin & Chabay, 1992; Lepper & Chabay, 1988; Putnam, 1987; Wenger, 1987). Although there are many ways in which computers are different from people and many things that computers can do better than people, it has seemed to many recent researchers that a better understanding of the dynamics of successful human tutoring might help us to design more effective computer tutors as well (McArthur, Stasz, & Zmuidzinas, 1990; Merrill, Reiser, Merrill, & Landes, 1995).

**BACKGROUND**

Certainly, this was true in our own case. Having first become interested in the educational uses of computers as a particularly felicitous laboratory for study-
ing both the determinants of children’s intrinsic motivation and the effects of different forms of motivation on children’s learning (Lepper, 1985; see also Cordova & Lepper, 1996; Parker & Lepper, 1992), we subsequently came into contact with a variety of earlier efforts by cognitive scientists to use the computational power of the computer to design “intelligent tutoring systems” (Sleeman & Brown, 1982; Wenger, 1987). Generally, these programs seemed well-designed for the efficient transmission of information and feedback to the student, based on that student’s current knowledge and misunderstandings of the topic, as assessed by research in cognitive psychology. Indeed, it was often exciting to see these designers building research findings from psychology and education into their programs.

These same programs, however, often seemed to take little account of the affective, motivational, and socioemotional states of the student. Instead, they frequently seemed to presume that the student using these systems would be constantly attentive, highly motivated, and concerned solely with learning as much as possible in as little time as necessary. How else could one explain the existence of tutorial computer programs like the one that sought to correct the fundamental misunderstandings of a struggling remedial student who had asserted that 87 multiplied by 43 yielded 32 with the following pithy commentary:

Your answer is wrong.

Possible causes of error:

1. You multiplied the number in the multiplicand by the number directly beneath it in the multiplier, and you wrote down the carried number, ignoring the units number.

It seemed almost as if programs like this were being designed for robotic, rather than for human, learners—for pupils whose sole mission in life was to improve their task performance as rapidly as possible.

Such assumptions seemed to us unrealistic, especially since these tutoring programs were often explicitly designated as having been designed for use with previously unwilling and unsuccessful students, already identified as requiring remediation in a given area. We began, therefore, to search the educational literature for research on the actual process of tutoring that might help us to highlight the importance of motivational as well as cognitive factors in the tutoring process that we had found missing from the research on computer-based tutors. Surprisingly, although there were clear demonstrations of the overall instructional effectiveness of such techniques, there was virtually no relevant literature on the process of one-to-one human tutoring. In contrast to the many volumes that had been written regarding teaching techniques in the standard classroom, where one teacher must simultaneously seek to instruct and motivate 30 different children who vary in their current levels of
achievement and motivation, almost nobody had tried to examine the tutorial process systematically.

Of course, it is possible at a glance to identify several general factors that undoubtedly contribute to the greater effectiveness of tutorials, compared with traditional classroom practices. Most prominently, tutorials provide a venue for learning that is inherently more individualized, more immediate, and more interactive than most common school settings. Let us consider each of these factors, briefly, in turn.

**Individualization.** First, and more obviously, the tutorial is inherently individualized. In contrast to standard classrooms, in which single teachers must divide their attention and energies across 30 different students, the student in a tutorial session has the complete attention of the tutor. This individualization, in turn, permits the tutor to elicit from each student a much higher level of on-task attention and effort. It is, in addition, a virtual prerequisite for the high levels of both immediacy and interactivity that also characterize the tutorial process.

**Immediacy.** Thus, in an individual tutorial, both knowledge of results and other forms of feedback and instruction are received by students as, or shortly after, they work on specific problems or activities. Reinforcement for correct work is therefore more effective, and constructive feedback is more likely to be understood and receive attention. Corrections can be made “on-line,” and general principles can be related to specific instances at once. This situation is quite unlike much of current formal education in the classroom where homework assignments, papers, and problem sets are often returned with grades and other relevant feedback days or weeks after completion of the work itself.

**Interactivity.** Similarly, instructional methods in a tutorial are typically more interactive than those in a normal classroom, in the sense that the tutors’ choices about what activities to present, what assistance to offer, what encouragement to give, and so forth usually depend heavily on the tutors’ careful observations of their students. Both tutors’ goals and strategies, in short, depend on information they receive from students (both verbal and nonverbal) and on their perceptions of the current skills and knowledge and the current level of motivation of their tutees. As a result, tasks, feedback, instruction, encouragement, and so on, can all be tailored to the cognitive and motivational profiles and requirements of individual students.

Although these general considerations are of critical importance, our hope was to understand better the more detailed dynamics of successful tutorials. If we wanted to see what more specific factors were critical in producing the substantial gains that individual tutoring seemed capable of producing, how-
ever, it appeared we would have to investigate that question ourselves. In the end, we decided to do just that.

**STUDYING "EXPERT" TUTORS**

The remainder of this chapter, then, seeks to provide a brief overview of some of the main findings of a set of studies, conducted over the past decade, of what makes individual tutoring such a successful educational method (e.g., Lepper, Aspinwall, Mumme, & Chabay, 1990; Lepper, Drake, & O'Donnell-Johnson, 1997; Lepper & Chabay, 1988; Lepper, Woolverton, Mumme, & Gurtner, 1993; Woolverton, in preparation). Some of these factors, as we shall see, are fairly obvious. Others are less so, though, and become apparent only after detailed observation and careful study. These latter, more subtle factors in the success of the tutorial method, we believe, are often the result of successful tutors trying to accomplish sometimes conflicting cognitive, information-transmittal, versus motivational or affective, goals at the same time, as we describe later in this chapter.

Our studies involved a simple procedure. First, we sought to identify individuals who seemed likely to be highly effective as tutors. We did so by asking a number of schools, teachers, and tutoring agencies to identify for us people whom they considered particularly qualified and highly effective (or likely to be highly effective) as individual tutors. We then interviewed these nominees and, once we had documented that they had indeed had experience in teaching or tutoring in the relevant domain and age range, invited them to participate in our studies by actually serving as a tutor for a number of different students.

These tutoring sessions were videotaped and transcribed for analysis. Learning by the tutees was assessed via traditional written tests on the material covered, which were administered both before and after the tutoring sessions. Motivation was assessed via self-report measures as well as ratings of the videotaped sessions. In addition, tutors were asked to watch the videotapes of their own sessions and to provide a running commentary on what they could recall about what they had been thinking and feeling and what options they had been considering as each session progressed. A number of our best tutors were also interviewed more generally regarding their perceptions and philosophies about tutoring.

To simplify our analytic task somewhat, in all of our studies the topic of study involved some aspect of elementary mathematics, ranging from basic addition to fractions to multistage word problems. Similarly, the students who served as our tutees were all elementary school students who ranged, depending on the topic under study, from first through sixth grade. In most of our studies, as well, the students selected as tutees had been identified by their schools as particularly in need of remedial help on the topic, although we
have recently also collected data from one sample of highly successful students who will serve as a contrast group as well.

Highly effective or "expert" tutors were then identified on the basis of their actual degree of observable success, across a number of different tutees, in promoting student learning and motivation. The tutoring sessions conducted by these highly effective tutors were analyzed from a number of perspectives and were contrasted with tutoring sessions conducted by less experienced or by equally experienced but objectively less successful tutors. The goal of our analyses was to begin to identify the goals, strategies, and specific techniques that might contribute to the success of an individual tutorial.

SOME GENERAL PRELIMINARY FINDINGS

Before we turn to the results of our comparisons between more and less empirically effective tutors, however, there are a number of preliminary findings from this project that will help to contextualize these comparative results. Let us begin by highlighting these general findings, then, if only in capsule form.

The Tutorial Process

The first "preliminary" finding from our observations of tutorial interactions is that there were, at least in the domain of mathematics, some general commonalities in the nature of the typical tutoring sessions that seemed to be shared by virtually all of our experienced tutors, regardless of their level of relative success. Specifically, there seemed to be in our tutoring sessions a series of recurrent phases, in which the goals and strategies of the tutors characteristically shifted as their students received problems, assistance, feedback, and instruction. Because a knowledge of this "phase structure" of the tutoring sessions will provide a useful background and context for understanding the differences between more and less effective tutors to be considered below, it is worth outlining this structure here.

In particular, once past an initial "introduction" period (in which tutors typically introduced themselves and the topic that was to be studied, and sought to establish some initial rapport with the student), most of the tutoring sessions we observed showed the following recurrent sequence of phases as students worked through a series of problems:

**Problem selection.** First, the tutors selected a problem for presentation to the student. These selections were based, in large part, on the tutors' diagnoses of their students' current knowledge and (mis)understandings of the material to be covered and on their perceptions of the students' present motivational state. In this initial phase, the tutors' general goal seemed to be to select a problem that would provide either a good learning experience, a
motivational boost, and/or an opportunity to gain diagnostic information about the students' current state of knowledge and misconceptions.

**Problem presentation.** Second, the tutors presented the selected problem to the student, often accompanied by various encouragements, exhortations, admonitions, or problem descriptions. In this presentation phase, the tutors' main aims seemed to be to provide students with helpful information or forewarning about features of the problem and/or to motivate students and encourage their involvement and persistence at the activity.

**Problem solution.** In the third phase, control shifted somewhat to the tutee, as the student proceeded to try to solve the problem that had been presented by the tutor. During this third phase, typically, tutors sought to provide sufficient scaffolding, assistance, encouragement, and feedback to permit their students to reach a correct solution to the problem. Only very rarely, however, did tutors (once a problem had been presented) actually provide the students directly with correct solutions or explicitly direct them in correct solution procedures.

**Reflection.** Once the problem had been correctly solved, tutors frequently sought to encourage the student to reflect on the solution process—to articulate the meaning of the problem, to discuss the lessons that had been learned or the steps that had been followed, or to consider the relationship of this problem to other problems or to other contexts.

**Instruction.** Finally, when necessary, tutors can provide fairly direct instruction about concepts or procedures that the student has not previously encountered. Because our particular tutoring protocols involved primarily remedial students who had already been exposed at some length, and without much success, to didactic instruction on the topics to be covered, this phase proved relatively uncommon in our sample. In other uses of tutoring to present new concepts and procedures, however, such concerns would presumably prove much more crucial and prominent.

**A General Framework**

A second crucial background finding is that our best tutors seemed to devote constant and considerable attention to motivating and providing emotional support for students, as well as to simply providing feedback and transmitting information. Indeed, the simultaneous focus of effective tutors on both affective and cognitive factors in the tutoring process is itself one central feature of our general model of expert tutoring. Although space limitations preclude an extended presentation of this analysis, our basic presumption is that highly successful tutors seek to develop and maintain a "working model" of each
tutee that encompasses both the current emotional and knowledge states of their students, updating the working model as they gather more information and observe the students progressing through the tutoring session.

Indeed, for purposes of understanding the goals and strategies of excellent tutors, it has proved to us a useful oversimplification to think of these tutors as constructing and maintaining two separate types of diagnostic models of their students.

**Cognitive models.** The first of these involves a cognitive model that is focused on the student’s current state of knowledge/ignorance and on the possible systematic misunderstandings or “bugs” that may characterize that student’s understanding of the material. Here we have in mind the sort of diagnostic informational model that has long been assumed and studied by those involved in the design of intelligent tutoring systems (e.g., Burton & Brown, 1979; Sleeman & Brown, 1982; Wenger, 1987).

**Motivational models.** The second of these, by contrast, involves an affective model that focuses on the student’s apparent current level of motivation, attention, interest, and self-confidence in the relevant domain of study. Diagnostic models of this latter sort, concerning student motivation, have received considerably less attention in previous research (del Soldato & du Boulay, 1995; Derry & Potts, 1998; Lepper & Chabay, 1988).

Both of these working models, we presume, are continuously modified and updated during the course of an effective tutoring session, as tutors watch students confront, solve, discuss, and/or fail to master actual problems. Subsequent judgments and decisions about tutorial goals and strategies are then predicted to be, in an interactive and responsive fashion, a joint function of the tutor’s models of these two aspects of their students’ current functioning. In particular, there are obviously three basic relationships that may exist between the pedagogical implications of a tutor’s hypothetically separate models of an individual tutee’s present cognitive and present motivational states. At any particular choice point in a tutoring session the implications of a purely cognitive versus a purely motivational analysis may be either entirely congruent with one another, simply independent of each other, or directly in conflict with one another. Each of these three cases, we believe, has different implications for what decision the tutor is likely to make.

Consider, for example, the simple case of a tutor making a decision about what problem to next give a particular student, under these three different conditions:

**Congruent.** First, the tutor’s cognitive versus motivational diagnoses about the student may yield implications for action that are entirely congruent with one another. If the tutor infers (for instance, from the student’s immedi-
ately prior successful performance on several problems of the same type) that the student both (a) fully understands and (b) feels completely comfortable with a particular type of problem, then the situation is simple. Both cognitive and motivational analyses would suggest that the next problem to be presented should be significantly more difficult than the problem just solved. Moreover, since such a decision follows from both models, we would expect this decision to be an easy one for tutors, and we would expect most tutors to behave in the same fashion when faced with this same situation.

**Independent.** A second possibility is that either the tutor’s cognitive or motivational analysis independently suggests some decision that might have positive effects on one dimension, without any direct effect on the other. If the tutor, for example, believes that the student (a) fully understands the current problems, but (b) is entirely disinterested in the task at hand, the tutor may decide not only to select a more difficult problem, but also to present that problem in a context that is personalized according to the student’s interests (e.g., a problem involving sports or music).

**Conflicting.** Finally, a tutor’s cognitive versus motivational analyses may point in precisely opposite directions. Thus, a tutor who feels that the student (a) does not understand the problem well but (b) is nonetheless overconfident and anxious to move to more complex problems may experience a sense of clear conflict, and that tutor’s decision may depend on his or her perception of the relative strength and importance of these two competing factors for this particular student. In one such case, we have seen a highly effective tutor deliberately select a problem that the tutor expected would “look” more difficult to the student, without any increase in actual difficulty level; in another instance, we have seen an equally successful tutor choose to present a more difficult problem but with an unusually high level of verbal scaffolding designed to help the student avoid an abject failure. More generally, such cases of direct conflict between the implications of cognitive and motivational diagnoses are predicted to be most likely to prove difficult for tutors, to result in pedagogical “compromises” between efficient information transfer and motivationally supportive pedagogy, and to produce potentially counterintuitive tutoring strategies or techniques. Our discussion below highlights the ways in which truly expert tutors demonstrate these strategies and techniques.

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1In the long run, of course, any strategies that do have an immediate positive impact on either learning alone or motivation alone should also have positive subsequent effects in both domains. Thus, even under highly controlled experimental conditions, “purely cognitive” factors that demonstrably enhance learning can also be shown to later enhance intrinsic motivation as well (e.g., Bandura & Schunk, 1981). Conversely, “purely motivational” factors that demonstrably enhance intrinsic interest can also be shown to later enhance learning as well (e.g., Cordova & Lepper, 1996).
THE "EXPERT" TUTOR

A critical finding from our observations of tutorial interactions, then, is that there are individuals who do seem to qualify as "expert" or highly effective tutors. Thus, in all of our samples, we were able to identify some tutors who proved empirically effective in promoting both learning and motivation, in all or virtually all of the students with whom they worked. The students tutored by these expert tutors showed, on independent measures of cognition and motivation, clearly greater gains than would have been expected solely on the basis of their initial levels of achievement in the domain.

In fact, by most standards, the progress achieved by our very best tutors in a limited number of individual sessions was often truly remarkable. These most successful tutors were not just effective; they were often superb. At their best, they were able to turn initially resistant, alienated, and seemingly helpless students into interested and excited participants in the learning process. At their best, they were able to help remedial students to progress through what would normally have been weeks or months of curriculum material in a very short time. Moreover, gains in students' learning remained apparent following and outside of the tutoring situation, showing that these gains were not simply the result of differences in the immediate support and scaffolding that tutors provided during the experimental sessions.

Similarly, another important finding was that there did seem to be some commonalities, on at least a number of dimensions, in the goals, strategies, and techniques of those tutors who were highly successful. Indeed, when we compared the various sessions conducted by our best tutors as they each worked with a number of different students, there was a quite surprising level of consistency in their individual approaches across different tutees. Although these top tutors were indeed very responsive to differences among the children they tutored, they did display characteristic styles of instructing and motivating students. Though quick to respond to differences in students, these tutors did so within a basic framework that they established and maintained. Equally important, there were at least some elements of these tutors' approaches that appeared in common across different particular expert tutors, suggesting the potential utility of an analysis of these common elements in the styles of these highly effective individuals.

THE INSPIRE MODEL

With this general background, then, let us turn to some of the more specific strategies and techniques that we found to be especially characteristic of our most effective tutors, as compared with their less effective or less experienced counterparts. Many of our specific findings from these comparisons, we believe, can be summarized in what Lepper, Drake, and O'Donnell-Johnson
(1997) have called the INSPIRE model of tutoring success. This acronym seeks to highlight seven critical characteristics of demonstrably "expert" tutors in our studies: the ways in which our best tutors proved simultaneously Intelligent, Nurturant, Socratic, Progressive, Indirect, Reflective, and Encouraging. Let us then examine each of these specific factors, in turn, in more detail.

**Intelligent**

It must seem like a truism to begin by asserting that highly effective tutors are highly knowledgeable and intelligent. Other things being equal, who would ever have argued the opposite? Nevertheless, it may still prove instructive to examine the several sorts of knowledge that our best tutors seem to possess:

- **Subject-matter knowledge.** Certainly excellent teachers in any context must be expected to know thoroughly the material they are teaching. Still, we found ourselves impressed by the depth and breadth of the subject-matter knowledge that our top tutors displayed. For example, compared with their less effective counterparts, our highly effective tutors were more likely to provide relevant historical information about the topic that they thought might be instructive or motivating to students, and they were much more effective in using concrete manipulatives and visual models to help illustrate difficult problems to students. Perhaps most important, these top tutors seemed able to produce a much wider variety of real-world analogies that could be used to help students understand difficult new concepts, such as negative numbers and fractions.

- **Subject-specific pedagogical knowledge.** Equally striking in our tutoring protocols were differences between our most and least effective tutors in what has been called subject-specific pedagogical knowledge. Our best tutors knew, for example, what sorts of problems were most likely to prove especially difficult for students or to elicit particular sorts of errors from them. They even seemed to know which sorts of problems were likely to appear more difficult to students even though they were not, and which sorts of problems were likely to appear easier to students than they really were.

- **General pedagogical knowledge.** Finally, our best tutors also seemed to show greater general pedagogical knowledge than their peers. Thus, they were more likely both to use and to be able to articulate the variety of instructional and motivational techniques detailed in the following sections.

**Nurturant**

At the same time, our best tutors were not simply highly knowledgeable automations; they were also highly supportive and nurturing of students. At the outset of
each tutoring session, for instance, they were more likely to begin by trying to establish some personal rapport with their students—conversing with the students about their interests in and outside of school, their friends and families, their teachers, and the like. Throughout the tutoring sessions, these tutors displayed warmth and concern. They were continuously attentive to their students, they empathized with students' difficulties, and they showed confidence in their students' ability to succeed at the task. Again, although such strategies may sound like they should be intuitive, we did on occasion witness sessions with less effective tutors that resulted in students crying or burying their heads in their hands, despite the fact that such tutors may have come highly recommended by school districts where they served as classroom teachers.

**Socratic**

In contrast to our first two features of intelligence and nurturance, which may seem self-evident as desiderata of good tutors, our third feature is potentially more counterintuitive. In particular, our best tutors seem to prefer a Socratic to a more didactic approach, at least when they are working with students who have a history of failure at the topic.

**Questions, not directions.** The first and most obvious feature of our top tutors' Socratic approach can be seen in their constant use of questions, rather than directions or assertions, in working with tutees. Although their questions may often be leading or informative, these tutors try to draw as much as possible from the student and to impose as little as necessary on the student. Indeed, more than 90% of the remarks that our best tutors make are likely to be in the form of questions.

**Hints, not answers.** In a related vein, our most effective tutors also seek to avoid directly giving students answers. Instead they prefer to offer hints or suggestions, to help students take the next step on their own. Moreover, good tutors often persist in this strategy, offering five or six hints in succession if their initial efforts prove unsuccessful in leading students to the correct answer. Indeed, if we did not have clear outcome data establishing the great success of these same tutors, it would be easy to believe that such an initially inefficient strategy might prove quite dysfunctional. Yet it appears that the advantages of this Socratic approach, at least with remedial students, must far outweigh its superficial inefficiency.

**Productive versus nonproductive errors.** Finally, in clear contrast to their less effective counterparts, our best tutors displayed a more highly nuanced and sophisticated understanding of the different types of errors that students may make (Lepper et al., 1997). Whereas our less effective tutors tended to respond in a similar fashion to almost any error that students made, our most
effective tutors distinguished different types of errors that had different implications for action by the tutor. At the simplest level, for instance, our best tutors would often simply ignore small errors, especially when these errors did not prevent the tutee from reaching a correct answer, although such errors might also lead these tutors to provide subsequent problems that examined these issues further. Our less successful tutors, however, seemed unable to let any error pass, no matter how trivial or inconsequential.

More important, our best tutors seemed to distinguish between what we might call “productive” and “nonproductive” errors. In particular, to these tutors, some student errors seemed “productive,” in the sense that tutors believed that their occurrence would provide good occasions for students, with some subtle guidance from the tutor, to discover their own mistakes in a manner that would promote lasting learning. Such errors were therefore deliberately allowed to occur by the tutors, so that they could then be systematically “debugged,” as described below. By contrast, these tutors also believed that there were other student errors that (a) could be corrected only by a more direct and explicit intervention by the tutor, and (b) if left uncorrected, would lead the student down a dysfunctional path. When “nonproductive” errors of this sort occurred, then, these same excellent tutors were quick to intervene in a more immediate and direct fashion.

**Progressive**

Yet a fourth characteristic of our expert tutors concerns the planful and progressive structure they create in the tutoring situation. Aspects of this general approach can be seen in a number of domains, including tutors’ selections of problems for presentation to students, their systematic techniques for addressing student errors and misconceptions, and their use of a variety of predictable routines across the tutoring session.

**Problem progression.** Thus, in contrast to many less effective tutors, our expert tutors clearly plan their tutoring sessions to involve a systematic progression of problem types of increasing difficulty or complexity. Although the rate of progression may vary considerably with different students, these better tutors always begin with problems deliberately selected to allow them to observe and diagnose their students’ initial levels of knowledge and misunderstanding. Subsequent problems are then selected that provide opportunities for the correction of any systematic misunderstandings or “bugs” that students have displayed. Once students have proved competent and confident at a given problem level, then, new and more difficult problem types are introduced, and the same cycle of diagnosis, debugging, and increased difficulty is repeated. Surprisingly, our less effective tutors do not regularly use these seemingly self-evident tactics.
Systematic debugging. A similar, highly systematic progression is evident, in reverse, in our best tutors’ attempts to correct or “debug” students’ underlying misconceptions. Here, because these tutors’ general goal is to prompt students to discover for themselves the reasons for their errors, excellent tutors who confront students who have made errors that reflect basic misunderstandings routinely begin with very general hints and questions. Only if these initial general prompts fail do these tutors start to become increasingly specific and pointed in their questions and suggestions, until the student attains the desired insight.

Progressive routines. Likewise, there is a more general sense in which the tutoring sessions of our most successful tutors are more systematic and progressive than those of our less successful tutors, because our better tutors are generally much more effective in structuring their tutoring sessions through the use of recurring routines. Such routines help to make clear to students the structure of the tutoring session and, in turn, help to focus the students’ attention on appropriate issues at different phases of the tutorial. As students internalize this structure, less and less guidance is needed from the tutor to make the tutorial run smoothly.

Indirect

Closely related to this Socratic stance adopted by our most effective tutors is a fifth characteristic, namely, the indirect style that these tutors typically employ, especially in working with students known to have a history of difficulty in the relevant domain of study. Once again, as with their Socratic approach, it is the strength of tutors’ commitment to this style, rather than its existence, which most impressed us in the protocols of our top tutors. These tutors are not just politely indirect with their tutees; they are excruciatingly so, and this indirectness can be seen in both the negative and the positive feedback they provide to students.

Negative feedback. Thus, few readers will find it surprising that our highly effective tutors are more likely to avoid overt criticism of their pupils. After all, direct negative feedback of this sort can clearly have deleterious effects on the motivation of students, especially those who have low levels of confidence in their abilities to begin with. What is rather more surprising, however, is that these tutors often manage to avoid ever saying explicitly that the student has made an error. Rather, in the face of an incorrect problem step or a mistaken answer to a question, these tutors are likely to pose a question that indirectly implies the existence of some error and, sometimes, the location of that error. Their goal is to prompt students into retracing their own steps and “catching” their own errors, while avoiding the negative motivational consequences of pointing explicitly to mistakes and failures on the part of the students.
**Positive feedback.** Less pervasive, but potentially even more surprising, are our findings concerning the positive feedback that highly successful tutors offer following student successes. For relative to their less successful peers, these top tutors also seem less likely to provide explicit or effusive praise to students, especially praise directed at the person rather than the process of problem solving. Although our less effective tutors appear to believe that frequent and profuse direct praise would prove motivating to their students, our outcome data suggest the opposite—that the adverse effects of turning the tutoring session into a highly evaluative context, at least for students at risk, may outweigh the potential benefits of greater positive reinforcement.

**Reflective**

To this point, our description of effective tutors may give the impression that these tutors are focused solely on procedural, as opposed to declarative, knowledge, on learning what, rather than why. Such an impression would be inaccurate, however, because our top tutors also devote considerable effort to encouraging reflection and articulation by students. More than their less effective counterparts, good tutors clearly seek to impart an understanding of underlying general principles, as well as specific procedures and strategies for solving problems.

This commitment to teaching for understanding can be seen in several related aspects of the protocols of highly effective tutors. These more effective tutors are more likely to ask students to articulate what they are learning, to explain their reasoning and their answers, and to generalize or relate their work in the tutoring session to other contexts and problems. At the same time, in keeping with their generally Socratic approach, it is important to emphasize that these tutors do most often attempt first to *elicit* these articulations, explanations, and generalizations from their students. These student-generated reflections may then be shaped and elaborated, if needed. Only when these tutors are convinced that such less direct tactics have proved insufficient, will they directly provide their own explanations or generalizations to their students.

**Articulation.** Thus, one common characteristic of our best tutors is their penchant for asking students to reflect aloud on what they have just done, immediately after a successful problem solution. In so doing, these tutors seek both to gain information from students about possible misunderstandings that might not have been evident from their solutions to the preceding problem and to help students to be able to understand, at a conceptual level, the operations they had used to solve the problem. Indeed, one particularly successful tutor had students keep a running, written list in their own words of the general “lessons” they had learned from the problems they solved during the tutoring session.
**Explanation.** Similarly, these tutors are also likely to ask students to explain their answers and their procedures, periodically, after successful problem solutions. If, as is often the case, students provide an explanation that is accurate but incomplete, the tutor will elaborate on the student’s response, providing a model of a more complete explanation.

**Generalization.** Likewise, these tutors are also likely to ask students periodically how the work they had just done, or the problem they had just solved, might relate to some other type of problem or to some real-world situation that students would be familiar with and interested in.

**Encouraging**

Finally, by describing our best tutors with the term “encouraging,” we intend to encompass a wide range of techniques and strategies that our expert tutors employ to keep students interested, attentive, and involved with the topic at hand. These motivational strategies, which have been spelled out in more detail by Lepper et al. (1993), can be seen as falling into five basic categories. These categories reflect five potentially complementary sources of motivation for learning that tutors seek to sustain and increase (Lepper & Malone, 1987; Malone & Lepper, 1987):

**Confidence.** First, our best tutors are centrally concerned with bolstering students’ feelings of competence and mastery, and these concerns are heightened when students begin tutoring sessions with a past history of failure in the classroom and a low level of confidence in their ability in the domain at hand. As noted above, however, our most effective tutors do not simply praise these students more often or more profusely. Rather, their strategies for enhancing students’ feelings of competence are considerably more subtle. They frequently emphasize, for instance, the difficulty of the problems they are presenting, implicitly giving students an excuse if they do have difficulty and implicitly increasing the value of success for them if they do succeed.

**Challenge.** At the same time, our best tutors also do not constantly reassure students about their abilities, even when those students have been selected on the basis of their need for remedial help. Instead, our top tutors are more likely to challenge their students, to goad them into a desire to “show” the tutor just how much they can accomplish. Moreover, in their selection of problems to present and their decisions about how much help to provide on each, these tutors seek to confront students with problems that will be difficult, though not impossible, in the belief that such moderately high levels of challenge will be most effective in motivating students.
Curiosity. Third, our most successful tutors are also more likely to try to pique their students' sense of curiosity, to make them want to find out the answers on their own. These tutors are, for example, more likely to ask students to predict in advance how a current problem might prove similar to, or different from, a previous problem, so that they can see their own expectations confirmed or disconfirmed. Similarly, they may deliberately highlight inconsistencies between different facts or procedures that the student has previously learned in different contexts, to provoke the student to seek some resolution.

Control. In like fashion, our best tutors also seek to provide their students with a sense of personal control in the tutoring situation. Where it is possible to do so without negative instructional consequences, for instance, these tutors offer students choices or comply with their requests. They may also emphasize a student's sense of agency directly, and as noted above, they will generally avoid the sorts of direct didactic methods that would be likely to undermine a learner's feelings of control.

Contextualization. Finally, our top tutors seek to place otherwise purely abstract problems, especially in mathematics, into meaningful and interesting contexts. Students will be more motivated by a problem, these tutors believe, if that problem can be personalized so that students can see its relevance to familiar real-world contexts that they already care about. Likewise, these tutors believe that students will be more motivated to become involved with and to persist at problems that have been embedded in inherently enjoyable and provocative stories or fantasy contexts that make contact with the preexisting interests and knowledge of students.

SUMMARY

In short, our most effective tutors differ in many ways—in their goals, their strategies, and their specific knowledge and techniques—from their equally experienced, but less successful, counterparts. Nevertheless, the general picture, we hope, is clear: Our best tutors are those who are concerned simultaneously with students' learning on the one hand and their motivation on the other. Thus, these tutors do not consider their task to be merely the efficient provision of feedback and information as some early theories of learning might have implied (Lepper & Chabay, 1985). Nor are they willing to sacrifice learning for

2Unfortunately, the literature does suggest that students may sometimes make nonoptimal decisions about instructionally critical aspects of their learning if given total control over such factors (Lepper & Malone, 1987; Steinberg, 1989). As one example, children who have had a history of failure in the domain under study will often choose to stick with easier problems at which they are sure they can succeed, at the expense of opportunities for further learning, if they are given the opportunity to choose the problems they will try.
the sake of motivation, as critics of the so-called "self-esteem" movement in the schools have described (Stout, 2000). Rather than "dumbing down" the instructional content by presenting easy problems or preventing student errors in an attempt to preserve students' self-esteem, these tutors demonstrate knowledge of a wide array of systematic techniques, both for presenting information to students and for encouraging student involvement and persistence at a task.

These tutors share a generally Socratic approach, in the sense that they seek to draw as much as possible from the student and to impose as little as possible of themselves on the student. They ask questions, but do not give directions. They offer hints, but avoid giving answers. The feedback they provide students, regularly after failure and sometimes even after success, is typically indirect, to minimize the evaluative pressure of the situation. And, when they are at their best, they are superb, producing both high levels of student interest and attention and extensive learning in a quite limited period.

**IMPLICATIONS**

There are many reasons for studying what makes excellent tutors so effective at instructing and motivating their students. From a theoretical perspective, on the one hand, we see the study of individual tutoring sessions as a particularly informative laboratory for studying the dynamics of effective learning in general. In contrast to the vastly more common studies of learning in traditional classrooms, where issues of behavioral control, classroom management, simple time-on-task, and whole-class instruction often dominate discussions, studies of individual tutoring sessions permit us to examine in much greater detail the process of instruction, the types of feedback and assistance that promote learning, and the strategies that most enhance student motivation.

Because we believe in Kurt Lewin's dictum that "there is nothing so practical as a good theory," we believe that the practical importance of detailed observations of real-world learning that can contribute to the formation of more effective theories of motivation and instruction should not be underestimated. In addition, studies of the goals and strategies of especially effective tutors should also contribute to the improvement of current educational practices in a number of more immediate and direct ways.

First, such studies can serve as a basis for the design of more effective computer-based tutors. As we noted at the start of this chapter, the past 10 to 15 years have witnessed the development of a variety of computer-based tutors, and many of these programs have been based on considerably oversimplified models of the tutoring process. Traditionally, such programs have featured highly direct and didactic instruction to students, often pointing out each error the student makes, giving the correct answer to the student, describing the misconceptions underlying each error, and explicitly demonstrating correct solution processes. Usually little explicit attention, beyond
The inclusion of simple praise statements, is given to attempts to enhance or maintain student interest in the material; instead, an inherently attentive and motivated learner is simply presumed by these programs.

Clearly what highly effective human tutors do when they are at their best is quite different, as we have described above. Although we recognize that there may be many potentially critical differences between human and computer tutors that may influence the effectiveness of particular tutoring techniques (Lepper & Chabay, 1988), it nonetheless seems evident to us that the effectiveness of many computer tutors might be enhanced by a more complex, research-based model of the determinants of effective tutoring.

Moreover, the same may be true for many of the human tutors who currently work with children. Certainly, we found that even our most effective tutors almost never reported having received any formal training in working with students individually. Instead, most of their courses and student-teaching experiences were focused, quite reasonably, on the more common whole-classroom or small-group instructional settings. Hence, data of the sort collected in our studies may help to provide the basis for designing some systematic training for those who are likely to serve as tutors for our children.

As increasing numbers of even less experienced tutors become involved with children, both through parent or other volunteer tutoring programs at school and through commercial after-school tutoring programs, the need for effective tutor-training programs can only increase. Indeed, the success of formal educational intervention efforts, such as Clay's (1985, 1991) Reading Readiness program and Slavin's Success for All model (Slavin et al., 1996), that include the provision of periodic access to individual tutors for all students having academic problems, has provided a considerable further impetus to the regular use of human tutors in schools here and abroad.

Similarly, the detailed study of the techniques and strategies of expert adult tutors may even have implications for programs that seek to involve other students as tutors for younger, or less capable, peers (e.g., Fitz-Gibbon, 1977; Graesser, Bowers, Hacker, & Person, 1997)—programs that have been identified as perhaps the single most cost-effective intervention that our schools could implement with minimal difficulty tomorrow (e.g., Levin et al., 1984). Plainly, there will be many respects in which the dynamics of cross-age tutoring will necessarily differ from those of adult tutoring, for we certainly cannot expect young students to develop the same levels of knowledge and expertise as their older counterparts. Nonetheless, an increased understanding of effective tutoring methods may help us to create better structures, materials, and training procedures for students who are to serve as tutors in such cross-age tutoring programs.

Yet one further domain in which tutoring may become increasingly available in the future involves individual tutoring offered via the Internet. In this theoretically interesting setting, individual tutors virtually interact with individual students in real time, with a shared computer display serving as a “white board” that both parties can see and use.
Finally, if we consider the study of expert tutorials more generally, as a laboratory for the study of highly effective learning, there may even be lessons to be learned for traditional classroom practices as well. When we consider the truly extensive efforts devoted by our best tutors to maintaining students’ motivation, along with their general commitment to Socratic and inquiry-based strategies, the contrast with many traditional classroom practices seems striking. Instead, the goals and strategies of our expert tutors seem much closer to those of classroom teachers who seek to integrate into their classrooms the use of inherently interesting and demonstrably meaningful “projects” and other discovery-oriented educational techniques (e.g., Bruner, 1966; Edwards, Gandini, & Foreman, 1993; Katz & Chard, 1989; Lampert, 1986). In this respect, perhaps the most general lesson to emerge from our studies of highly successful tutors is that encompassed in the ancient proverb about the process of truly effective learning:

I hear and I forget. I see and I remember. I do and I understand.

Teachers’ Questions and Answers

**Q:** I have two related questions. First as a teacher, I truly believe those characteristics described in your chapter do make effective tutors and teachers. However, oftentimes when a teacher uses the kind of strategies described in your chapter (Socratic, inquiry-based, indirect positive feedback, etc.), these tend to be received by students (especially those who are not very successful) with some resistance, especially at the beginning. Was this observed in your studies? What can be done to minimize this response from students? Were there any differences in reactions between remedial and successful students?

Second, I wonder if there were any observed differences when using indirect positive feedback among remedial versus successful students or with students of different ages? Although I have found indirect feedback to be the most effective, as a teacher one of the hardest things for me is to achieve a balance with respect to positive feedback—not enough, too much, too direct, too indirect. Any suggestions on how to achieve this balance?

**A:** You raise really important questions about what is perhaps the most complex aspect of our expert tutors’ strategies, namely, their generally indirect and Socratic style. As your questions suggest, the use of this approach may sometimes require art, as well as science.

A first issue concerns students’ possible resistance to such techniques, especially at the outset. Although we did not see much of this response in the tutoring sessions we observed, we have seen this sort of resistance in many other settings. We think that it occurs primarily when students are trying simply to “get through” the material as quickly as possible and therefore see an indirect approach, relying on hints and questions rather than answers.
and directions, as inefficient and likely to prolong a tutoring or teaching situation.

This problem typically takes a different form for remedial versus successful students. For remedial students, resistance usually stems from a desire just to get through as quickly as possible, without any concern for actually learning the material. Hence, they would prefer it if they were just given the answers so that they can leave a situation they find an embarrassing reminder of their lack of competence in a domain. For more successful students, in contrast, this same response can occur for slightly different reasons, when they feel that they understand things well, but have simply forgotten (or never learned) some specific point that is now preventing them from going forward. Again in this situation, indirect techniques may be seen as simply slowing these good students down.

The hard part, of course, is how to prevent this reaction. We think there may be three reasons why we did not see this response very often in the tutoring sessions we studied. First, the sessions were a fixed length, so that there was no possibility of exiting the situation more quickly by simply "taking dictation" from the tutor. Second, our best tutors seemed to be very effective in using a variety of techniques to convince even the most problematic students that they really could learn the material, despite their past difficulties. Third, these tutors also seemed to find ways of making their students want to learn. Of the many techniques that we saw, perhaps the most striking was the ability of many of these tutors to make the tutoring session into a sort of game for students. Most generally, we think that students will generally accept these techniques once a good relationship has been established between teacher and student.

Finally, as you note, there certainly is a difficult balancing act that teachers using these techniques must negotiate, especially when it comes to the use of praise and positive feedback. Unfortunately, there is no simple answer to this one. On the one hand, feedback has to be clear: students must know when their responses are right and when they are wrong. On the other hand, praise must always be credible. In our sessions, tutors who praised remedial students who had succeeded at very simple problems as having "a great math mind" or being "a real whiz" clearly did not achieve the goals they had intended, as the incredulous looks on their students' faces plainly indicated. On the other hand, if there is not already a positive relationship between tutor and student, the tutor may need to make more use of explicit praise, and overt statements of confidence in the student's ability, at the start of a session, to build student confidence that the tutor is on his or her side.

Q: At the private school where I work, a fair number of teachers do not have an education degree. However, they do have advanced degrees in their subject areas and are excellent teachers. One of the characteristics of highly effective tutors mentioned in your chapter was their high general pedagogical knowledge. Did this knowledge come from having taken courses in the field of
education or from experience? Did most of these highly effective tutors have formal education training? From the standpoint of school administrators who very often have to read resumes of prospective teachers to decide which candidate will be hired, which if either of the two, subject-matter or pedagogical knowledge, seemed a more critical component of a highly effective teacher in the modern classroom?

**A:** In our sample, all of our tutors, the best and the worst alike, had had formal training in education, because that was one of the criteria by which we chose them. At the same time, in interviews, none of our tutors remembered ever receiving much training in one-to-one, as opposed to whole-class or small-group, situations. They seemed to think, therefore, that most of what they knew about tutoring they had learned by experience.

Obviously principals are often faced with choices among candidates with different sorts of credentials and training, in specific subjects versus general education, and this is an important issue. To be asked whether subject-matter expertise or general pedagogical expertise is more important, though, seems difficult. In the work of our best tutors, the two seem so intertwined that it is like asking whether a person's right leg or left leg is more important to walking. If we had to guess, we would say that it probably depends somewhat on the grade level of the students and the nature of the topic: that the more advanced the students and the more complex the topic, the more critical specific subject-matter knowledge is likely to be.

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**References**


The early adolescent developmental period is one in which individuals experience many changes, including the biological changes associated with puberty, important changes in relations with family and peers, and the social and educational changes resulting from transitions from elementary to junior high school and junior high school to high school (see Eccles & Wigfield, 1997; Wigfield, Eccles, & Pintrich, 1996). Different theorists (e.g.; Eccles & Midgley, 1989; Hill & Lynch, 1983; Midgley & Edelin, 1998) have proposed that these changes have significant impact on a variety of developmental outcomes. Many children make these changes relatively easily. Others, however, have difficulty with one or another of these changes and as a result are at risk for various negative outcomes. We focus in this chapter on changes in early adolescents’ motivation and self-concepts, and how changes in these characteristics are influenced by different experiences in middle schools. A special focus of this chapter is on gender differences in motivation and self-concept at early adolescence. We begin the chapter with a brief discussion of some of the important biological and cognitive changes that occur during early adolescence.

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adolescence, to provide background for our discussion of changes in children’s self-concepts and motivation.

BIOLOGICAL AND COGNITIVE CHANGES AT EARLY ADOLESCENCE

The biological changes associated with puberty are the most dramatic ones that individuals experience during their lifetimes (outside of prenatal development), and these changes have been used to characterize the early adolescent period as a period of "storm and stress," where there is a great deal of conflict between children, parents, and teachers (e.g., Blos, 1979; Hall, 1904). We have heard teachers (and parents) say that "If we could just lock kids up for those years things would be fine"! While it is undeniable that major physical changes occur during early adolescence, many researchers now believe that the characterization of this period as one of storm and stress is an overstatement (see, for example, Dornbusch, Petersen, & Hetherington, 1991). Yet Lerner, Entwisle, and Hauser (1994) again used the term "crisis" in their description of the state of contemporary American adolescents. Whether or not adolescents are in crisis, the biological changes they go through do have many influences on their thinking and behavior.

Because these changes occur at different times for boys and girls their impact on each sex differs (see Malina, 1990). There is some consensus that for boys early maturity is advantageous, particularly with respect to their participation in sports activities (see Malina, 1990) and social standing in school (Petersen, 1985). For girls early maturity can be problematic, as they will be the first to experience pubertal changes and thus can feel “out of sync” with their agemates (see Petersen, 1988; Simmons & Blyth, 1987; Stattin & Magnusson, 1990). In fact, Simmons and her colleagues report that early-maturing girls have the lowest self-esteem and the most difficulty adjusting to school transitions, particularly the transition from elementary to junior high school (e.g., Simmons, Blyth, Van Cleave, & Bush, 1979). Because girls enter puberty earlier than boys do, they are more likely to be coping with pubertal changes at the same time they make the middle-grade school transition than are boys, and thus are more likely to face multiple transitions simultaneously. Like early-maturing girls, later-maturing boys also may have some difficulties due to their physical development being out of synchrony with their agemates.

One important educational implication of this work concerns the issue of timing for the transition from elementary to secondary school. Many researchers and educational policy analysts urged that middle-grade school should begin earlier, so that students make the school transition before they enter puberty, and many school districts have followed this advice. Middle school now often encompasses sixth through eighth grade, rather than seventh through ninth grade. Others have argued that a K-8 organizational structure
may be most beneficial to early adolescents. There is increasing awareness among educators that this is a unique developmental phase that requires careful structuring of educational environments (see further discussion later).

A great deal has been written about how children's thinking changes during the adolescent years (e.g., see Byrnes, 1988; Keating, 1990). For our purposes the most important changes to note are the increasing ability of children to think abstractly, consider the hypothetical as well as the real, engage in more sophisticated and elaborate information processing strategies, consider multiple dimensions of a problem at once, and reflect on oneself and on complicated problems (see Keating, 1990, for more complete discussion). Abstract thought and hypothetical thinking are hallmarks of Piaget's formal operations stage, the stage that he and his colleagues stated should emerge during adolescence (e.g., Piaget & Inhelder, 1973). Currently there is much debate about when exactly these kinds of cognitive processes emerge, and many researchers now question whether the emergence of these processes reflects global stage-like changes in cognitive skills as described by Piaget. However, most theorists do agree that these kinds of thought processes are more characteristic of adolescents' cognition than of younger children's cognition (e.g., see Fischer, 1980; Moshman, 1998).

Along with their impact on children's learning, these changes in children's thinking have important implications for individuals' self-concepts and motivation. Theorists such as Erikson (1963) and Harter (1990) view the adolescent years as a time of substantial change in children's self-concepts, as they consider what possibilities are available to them and try to come to a deeper understanding of themselves. These sorts of self-reflections require the kinds of higher-order cognitive processes just discussed. With motivation increasingly conceived in cognitive terms these changes also have implications for early adolescents' motivation.

CHANGES IN SELF-CONCEPT AND MOTIVATION DURING EARLY ADOLESCENCE

Self-Concept and Identity Development During Early Adolescence

As just noted, adolescence has long been thought to be a time of great change in children's self-concepts. Erikson (1963), in his groundbreaking work, characterized adolescence as the time in which individuals searched for their identity, either finding it or sinking into role confusion. More recently, Harter (1990, 1998) discussed how during middle adolescence the self-concept is both less integrated and more unstable than at earlier or later periods, and that perceived inconsistencies or conflicts in one's characteristics were a source of great concern during middle adolescence (see also Rosenberg, 1986;
Simmons & Blyth, 1987). Thus like Erikson, Harter proposed that a major task of adolescence is to integrate the disparate aspects of self.

One hallmark of recent research on adolescents' self-concepts is that researchers have focused on particular aspects of self-concept rather than just measuring individuals' general sense of themselves. They have developed measures of self-concept that have better psychometric properties than earlier scales. How the self organizes and regulates behavior also has been a major focus of recent work.

Markus and her colleagues (e.g., Markus & Nurius, 1986; Markus & Wurf, 1987) discussed how the self organizes and regulates behavior. They argued that individuals take information about the self and organize it into coherent frameworks that they call "self-schemas." For instance, students have a sense of themselves in the role of student, Markus and Nurius would call these self beliefs a "student self-schema." These self-schemas have a strong role in determining the goals we have, directing our behavior, and evaluating information we receive about ourselves. Those with strong student self-schemas are likely to do better in school and continue their educational pursuits. Markus also discussed how our self-concepts relate to our future activities, using the term "possible selves" to discuss the images we have of what we want to be in the future. The possible self notion is of course particularly germane to adolescents, because it is a period in which individuals explore different possibilities for themselves and begin to determine which roles are best and most appropriate for them.

Marsh and his colleagues have done a great deal of empirical work to examine the structure of self-concept, using Shavelson, Hubner, and Stanton's (1976) model of the self-concept as the theoretical basis for their work. They developed scales to measure children's self-concepts in many different activity domains, including both academic and nonacademic activities. Extensive factor analytic work with these scales has shown, first, there are clearly separate dimensions of self-concept even in very young children (see also Eccles, Wigfield, Harold, & Blumenfeld, 1993). Second, during middle childhood and early adolescence children's self-concepts appear to be organized hierarchically (e.g., Marsh, 1990; Marsh & Shavelson, 1985), with specific aspects of self-concept at the bottom of the hierarchy (e.g., math self-concept) and global self-concept at the top. Interestingly, during later adolescence there is less evidence for a hierarchical self-concept. These findings suggest an intriguing pattern in self-concept development across childhood and adolescence, from differentiated and hierarchical to differentiated into quite distinct components.

Harter (1982, 1990) also has done extensive work on the structure of children's and adolescents' self-concepts. Her work also has shown that children's self-concepts are multidimensional and increase in complexity during adolescence. In addition to her work on the structure of self-concept Harter has focused on the nature of some important self-processes during
adolescence. For example, she and her colleagues examined adolescents' sense of whether they could express their "true" selves or were not able to do so, in different settings. They have found that adolescents who hide their "true" selves do so because they think others devalue their true selves, because they want to make a good impression on others, or because they want to fit in. Adolescents who think others devalue their true selves have the lowest self-esteem (see Harter, 1998; Harter, Waters, & Whitesell, 1997, for further discussion). Adolescents believing they must receive approval from others before they can approve themselves also tend to have lower self-esteem.

The issue of how self-esteem changes at early adolescence has been an important concern of various researchers (see Harter, 1998). Self-esteem often is defined as one's overall self-evaluation. Self-esteem changes in important ways at early adolescence. Simmons, Rosenberg, and Rosenberg (1973) showed that following the transition to junior high school early adolescents' general self-esteem is lower and less stable and their self-consciousness, higher. However, there has been some debate about how prevalent these negative changes in general self-esteem are. In our work (Eccles, Wigfield, Flanagan, Miller, Reuman, & Yee, 1989; Wigfield, Eccles, Mac Iver, Reuman, & Midgley, 1991), children's self-esteem was lowest immediately after the transition into junior high school in seventh grade, but increased during students' seventh grade year. In their longitudinal work Blyth, Simmons, and Carlton-Ford (1983) and Simmons et al. (1979) found that for most children, self-esteem scores increase across middle adolescence (see also Dusek & Flaherty, 1981; O'Malley & Bachman, 1983). In Simmons and Blyth's work, white girls who make the transition to junior high school are the only group to show consistent evidence of declines in self-esteem. Eccles and her colleagues (Eccles & Midgley, 1989) and Simmons and her colleagues (Blyth et al., 1983; Simmons, Rosenberg, & Rosenberg, 1973; Simmons & Blyth, 1987) have postulated that these changes in early adolescents' self-beliefs are due in part to changes in the school environment that occur following the transition to junior high; these changes are discussed in more detail later.

Determining which specific components of children's self-concepts relate most strongly to their overall self-esteem or self-worth at different ages has been an important research topic. Harter (1986) found that during the elementary school years and adolescence, perceptions of physical appearance and social acceptance relate most strongly to children's feelings of self-worth (see Harter, 1990). These findings probably will come as no surprise to teachers and others working with early adolescents. Social status and physical appearance often seem to be much more important to adolescents than things like school success. The great changes in physical appearance occurring at this time likely are a major reason why adolescents are so concerned about their appearance.

A more difficult issue is determining exactly how the specific aspects of self-concept may influence general self-worth. Harter (1990) proposed that
individuals' general self-worth is determined in part by the synchrony between their sense of competence at different activities and the importance of those activities to them. Doing well in activities that are important should foster positive general self-worth. Harter has found support for this notion in her empirical work; children believing they are good at activities they think are important have more positive general self-worth than do children who believe certain activities are important but do not think they are competent at those activities.

This issue also has very important implications for students' school engagement. To the extent that adolescents' do well in school and believe it is important, they should remain engaged in academic activities. If either their performance decreases or they begin to decide that school is not important, then their engagement will decrease. One of the challenges for middle school educators is that the perceived importance of school often decreases during adolescence because many adolescents begin to see social activities as more important to them at this time, and like those activities much more than academic tasks (see Eccles et al., 1989; Wigfield et al., 1991). We return to this issue later.

Changes in Early Adolescents' Achievement Motivation

Work on motivation and achievement-related beliefs has flourished in the last 25 years (see Eccles, Wigfield, & Schiefele, 1998; Pintrich & Schunk 1996, for review). Many researchers studying motivation have taken the broad perspective that it is children's interpretations of their achievement outcomes that are critical mediators of subsequent achievement behavior; therefore, students' beliefs about themselves and their achievement have been a major focus of research. Students' purposes for engaging in achievement activities also have received a great deal of attention; constructs concerned with these purposes include students' goals, and their valuing of achievement activities.

To organize the proliferation of motivation constructs, Eccles et al. (1998) proposed that they can be thought of in terms of two major questions students can ask themselves. One question is "Can I succeed on this task or activity?" Constructs related to this question include students' competence-related beliefs such as self-efficacy (Bandura, 1997; Stipek & Mac Iver, 1989), their attributions (or explanations) for success and failure (Weiner, 1985), and their perceptions of control over outcomes (Skinner, Zimmer-Gembeck, & Connell, 1998). In general, when students have high self-efficacy, the belief that they can control their achievement outcomes, and internal attributions for their success, they tend to be more positively motivated and perform better on different achievement tasks and activities (see Eccles et al., 1998, for complete review; see also Chapter 2 by Pajares and Schunk in this volume for further discussion of some of these constructs).
The second question is "Why do I want to do this activity?", a question having to do with the purposes for which students engage in academic activities. This question is crucial to motivation. Even if individuals believe they can succeed on a task or activity, they may not engage in it if they have no clear purpose for doing so. Constructs related to this question include students' valuing of achievement, goals for achievement, and intrinsic and extrinsic motivation. Eccles, Adler, Futterman, Goff, Kaczala, Meece, and Midgley (1983) defined three main aspects of children's valuing of achievement: their interest in the activity, its usefulness to them, and its relative importance to them. They found that students' valuing of achievement relates strongly to their choices of which activities to continue to do (Eccles et al., 1983; Meece, Wigfield, & Eccles, 1990). For example, when students value math they are more likely to keep taking math courses, when they have choices about which courses to take.

Researchers studying achievement goals initially focused on two major goal orientations. One goal orientation concerns individuals' desire to learn new things and master material; this orientation has been called a task mastery or learning goal orientation by different researchers (Ames, 1992; Dweck & Leggett, 1988; Nicholls, 1984). The second orientation concerns individuals' desires to outperform others and receive favorable evaluations of their performance; this orientation is termed ego or performance goal orientation. Recently researchers have explored dual aspects of the performance orientation, dividing it into performance-approach and performance-avoidance goals (see Pintrich, 2000). Performance-approach goals include things like wanting to do better than others. Performance-avoidance goals are things like not wanting to appear stupid. Students adopting a performance-approach orientation tend to be more strongly motivated for achievement activities than do students adopting a performance-avoidance orientation (Elliot & Harackiewicz, 1996).

Intrinsic motivation refers to doing an activity out of interest and personal engagement in it, whereas extrinsic motivation means doing an activity to receive a reward or some other kind of recognition (see Chapter 4 by Deci and Ryan in this volume). Researchers assessing these constructs have found that when students hold mastery goals, performance-approach goals, are intrinsically motivated, and highly value achievement they will achieve better and be more engaged in learning activities.

Researchers looking at how these beliefs, goals, and values change during early adolescence and adolescence often have found that adolescents' motivation declines during this period (see Anderman & Maehr, 1994; Eccles et al., 1998, for review). Specifically, early adolescents have lower perceptions of their competence for different school subjects than do their younger peers (Eccles et al., 1989; Marsh, 1989; Wigfield et al., 1991). Many early adolescents become more anxious about school in general and mathematics in particular (Brush, 1980; Harter, Whitesell, & Kowalski, 1992). Students' valuing of different school subjects often declines as they move through school, with the declines
especially marked across the transition to middle school (Eccles et al., 1989; Wigfield et al., 1991). Their intrinsic motivation for learning often decreases (Harter, 1981; Harter et al., 1992). Students often focus more on performance goals as they get older, at the expense of task mastery goals (Anderman & Midgley, 1997; Midgley, Anderman, & Hicks, 1995).

Researchers have explained these changes in two major (and complementary) ways. One explanation focuses on cognitive and other changes within the individual. As children mature cognitively and receive increasing amounts of evaluative feedback, they come to understand more clearly their relative level of performance and what the evaluative feedback means (see Stipek & McIver, 1989, for further discussion). As one illustration of this process, when asked how good they are in reading, most first-grade children think they are one of the best in the class. Later in elementary school fewer children believe this (see Nicholls, 1979). The second explanation acknowledges these individual changes, but focuses more on the kinds of experiences children have in school as the reason for the declines in motivation. A major premise of this explanation is that when schools focus too much on ability evaluations, social comparison between students, and performance goals, many students’ sense of competence, intrinsic motivation, and mastery goal orientation will decrease. The particular ways in which the transition from elementary school to middle school can produce these effects is the topic of the next section.

THE MIDDLE-GRADE SCHOOL TRANSITION AND STUDENT MOTIVATION

The Transition to Traditional Junior High Schools

Traditional junior high schools (and middle schools) differ structurally in important ways from elementary schools. Most junior high schools are substantially larger than elementary schools, because they draw students from several elementary schools. As a result, students’ friendship networks often are disrupted as they attend classes with students from several different schools. Students also are likely to feel more anonymous because of the large size of many middle schools. Instruction is likely to be organized and taught departmentally. Thus junior high school teachers typically teach several different groups of students each day and are unlikely to teach any particular students for more than one year. This departmental structure can create a number of difficulties for students. One is that the curriculum often is not integrated across different subjects. A second is that students typically have several teachers each day with little opportunity to interact with any one teacher on any dimension except the academic content of what is being taught and disciplinary issues. Finally, family involvement in school often declines during the middle school years.
Researchers also have discussed how in traditional junior high schools and middle schools, classroom and school environments change away from practices that foster mastery goals and intrinsic motivation and focus instead on practices that promote a performance goal orientation in students (Eccles & Midgley, 1989; Maehr & Midgley, 1996; Wigfield et al., 1996). Such practices also can contribute to the decline in students’ academic competence beliefs, interest, and intrinsic motivation discussed earlier. We focus here on several particular changes in teacher–student relations and social organizations of classrooms and schools. The first is changes in authority relationships. Middle school classrooms, as compared with elementary school classrooms, are characterized by a greater emphasis on teacher control and discipline and fewer opportunities for student decision making, choice, and self-management (e.g., Midgley & Feldlaufer, 1987; Moos, 1979). These practices can reduce students’ sense of control and autonomy.

Second, traditional middle school classrooms, as compared with elementary school classrooms, often are characterized by less personal and positive teacher–student relationships (see Eccles & Midgley, 1989). For example, Trebilco, Atkinson, and Atkinson (1977) found that students reported less favorable interpersonal relations with their teachers after the transition to secondary school than before. Similarly, Feldlaufer, Midgley, and Eccles (1988) found that both students and observers rated junior high school math teachers as less friendly, less supportive, and less caring than the teachers these same students had one year earlier in the last year of elementary school. Positive and emotionally warm relations with teachers relate to students’ motivation and adjustment in the classroom (Wentzel, 1997).

Third, the shift to middle school is associated with systematic changes in the organization of instruction, such as increases in practices such as having the entire class working together, and between classroom ability grouping (see Eccles & Midgley, 1989). Such changes are likely to increase social comparison, concerns about evaluation, and competitiveness, all of which could foster an ego goal orientation and a stronger focus on perceived competence (see Rosenholtz & Simpson, 1984). In addition, under these learning conditions children doing less well in school will be more likely to begin to doubt their competence.

Fourth, junior high school teachers often feel less effective as teachers, especially for low-ability students. This was one of largest differences we found between sixth and seventh grade teachers in the Michigan Study of Adolescent Life Transitions. Seventh grade teachers in these junior high schools reported much lower confidence in their teaching efficacy than did the sixth grade elementary school teachers in the same school districts (Midgley, Feldlaufer, & Eccles, 1988). Others have reported similar results. Alexander and George (1981) found that teachers in traditional junior high schools had a lower sense of their teaching efficacy than did teachers in a more innovative middle-grade school.
Several studies have documented the impact of teacher efficacy on student beliefs, attitudes, motivation, and achievement. Alexander and George (1981), in the study just mentioned, found that teachers in the more innovative middle-grade schools had higher expectancies for student success and also were more likely to take personal responsibility for student failure than were the junior high school teachers. Ashton (1985) found that teachers' sense of efficacy relates positively to high school students' performance on math and language arts achievement test scores. More efficacious teachers also were more encouraging and supportive of students.

Fifth, despite what one might expect given what we know about cognitive development at this age, there is evidence that classwork during the first year of junior high school requires lower-level cognitive skills than classwork at the elementary level. One rationale often given for the large, departmentalized junior high school system is its efficiency in providing early adolescents with higher-level academic work and more varied academic courses taught by specialists in their fields (see Clark & Clark, 1993). It is argued that the early adolescents are ready for more formal instruction in the various subject areas. Two assumptions are implicit in this argument. First, it is assumed that more formal, departmentalized teaching is conducive to the learning of more advanced cognitive processes. Second, it is assumed that children in junior high school are undertaking learning tasks that require advanced (or higher-order) thinking in their departmentalized courses. Both of these assumptions have been questioned. For example, in an observational study of 11 junior high school science classes, only a very small proportion of tasks required higher-level creative or expressive skills; the most frequent activity involved copying answers from the board or textbook onto worksheets (Mergendoller, Marchman, Mitman, & Packer, 1988). Similarly, Walberg, House, and Steele (1973) rated the level of complexity of student assignments across grades 6 to 12 according to Bloom's taxonomy of educational objectives. The proportion of low-level activities peaked at grade 9, the first year after the students in this district made the transition into secondary school. Thus, although the students have been led to believe that they are moving to a more challenging school environment, they may well find themselves in classes that are reviewing the material they learned in elementary school, and as will be discussed next, they are likely to be given lower grades for their work. As we shall see below, this experience is not likely to facilitate their motivation.

Sixth, junior high school teachers appear to use a higher standard in judging students' competence and in grading their performance than do elementary school teachers (see Eccles & Midgley, 1989). There is no stronger predictor of students' sense of competence than the grades they receive. If grades change, then we would expect to see a concomitant shift in the adolescents' self-perceptions and academic motivation. There is evidence that junior high school teachers use stricter and more social comparison-based standards
than elementary school teachers to assess student competency and to evaluate student performance, leading to a drop in grades for many early adolescents as they make the junior high school transition. For example, Simmons and Blyth (1987) found a greater drop in grades between sixth and seventh grade for adolescents making the junior high school transition at this point than for adolescents enrolled in K–8 schools.

The decline in grades is not matched by a decline in the adolescents' scores on standardized achievement tests, suggesting that the decline reflects a change in grading practices rather than a change in the rate of the students' learning (Kavrell & Petersen, 1984). Imagine what this decline in grades might do to early adolescents' sense of competence, especially in light of the fact that the material is not likely to be more intellectually challenging. Indeed, even controlling for a youth's performance prior to the school transition, the magnitude of the grade drop following the transition into either junior high school or middle school is a major predictor of dropping out of school (Simmons & Blyth, 1987).

Finally, as noted above, peer networks are disrupted when children change schools. Many times friends are separated from one another, and it takes some time for children to reestablish social networks. Wigfield et al. (1991) found that children's sense of social competence was lowest immediately after the transition to junior high school, in comparison to before the transition or later in junior high school. Such disruptions could influence children's academic motivation as well.

In summary, traditional junior high schools and middle schools have a variety of organizational characteristics and classroom practices that have negative effects on students' competence beliefs, mastery goals, and intrinsic motivation for learning. Eccles and Midgley (1989) argued that a main reason these practices have a negative impact is that they are developmentally inappropriate for early adolescents. At a time when the children are growing cognitively and emotionally, desiring greater freedom and autonomy, and focusing on social relations, they experience teaching practices like those just described that do not fit well with the developmental characteristics of early adolescents. Therefore, for many early adolescents these practices contribute to the negative change in students' motivation and achievement-related beliefs. What has been done about these problems? That is the topic of the next section.

**Middle School Reform Efforts and Student Motivation**

Based in part on the research just reviewed, proposals by middle school experts, and the *Turning Points* report written by the Carnegie Council on Adolescent Development, middle schools across the country have begun to change greatly (see Alexander & George, 1981; Carnegie Council on Adolescent Development, 1981).
There is growing consensus about what kinds of changes should be made in middle-grade schools (Lipsitz, Mizell, Jackson, & Austin, 1997). One structural change adopted in many school districts has been to move the transition to middle school from after to before sixth grade, in part so that fewer students would experience pubertal changes at the same time they underwent the middle school transition. This change on its own accomplishes little; what is more important is changing school organization and instructional practices in systematic ways (Mac Iver & Epstein, 1993). Both the Carnegie Council on Adolescent Development and the National Middle Schools Association have made recommendations for how middle schools should be changed; a summary of their recommendations is presented in Table 1. As can be seen in the table, there is much overlap between the two sets of recommendations.

**TABLE 1**

**Recommendations for Restructuring Educational Practices in Middle-Grade Schools**

<table>
<thead>
<tr>
<th>Recommendations from the Carnegie Council on Adolescent Development</th>
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<tr>
<td>1. Turn large schools into smaller learning communities.</td>
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<tr>
<td>2. All students should receive a common core of high-level knowledge.</td>
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<td>3. All students should be given the opportunity to succeed.</td>
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<td>4. Teachers and administrators should be empowered to make important decisions.</td>
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<td>5. Middle-grade teachers should receive special preparation for teaching at the middle school level.</td>
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<tr>
<td>6. Early adolescents' fitness and health should be enhanced to enhance their academic performance.</td>
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<tr>
<td>7. Families should be reengaged in middle schools.</td>
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<tr>
<td>8. Connections between schools and communities need to be built.</td>
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<table>
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<tr>
<th>Recommendations from the National Middle School Association</th>
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<tbody>
<tr>
<td>1. Middle school educators should be knowledgeable about young adolescents.</td>
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<tr>
<td>2. The middle school curriculum should be balanced and responsive to the needs of young adolescents.</td>
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<td>3. There should be a range of organizational arrangements in middle schools.</td>
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<td>4. Instructional strategies should be varied.</td>
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<td>5. There should be full exploratory programs in different schools.</td>
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<td>6. Comprehensive advising and counseling should be provided for all students.</td>
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<td>7. All students should make continuous progress.</td>
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<td>8. Evaluation procedures should be compatible with the nature of young adolescents.</td>
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<tr>
<td>9. Teachers should have time for cooperative planning.</td>
</tr>
<tr>
<td>10. Each middle school should have a positive school climate.</td>
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Many of these recommendations have strong appeal for those interested in developmentally appropriate education for early adolescents. Indeed, several focus directly on the special nature of the early adolescence age period and how teachers need to be prepared specifically for working with this age group. From our perspective as developmental psychologists such recommendations are particularly important. Early adolescence is a unique developmental period in many respects, and designing educational programs to fit the developmental needs of early adolescents can facilitate students' learning and adjustment (see Eccles & Wigfield, 1997).

We also believe recommendations that increase the sense of community in middle schools are particularly important. A good example of this are the recommendations focusing on replacing department structures with teams of teachers working with the same group of students. This practice allows groups of teachers to spend more time with the same group of adolescents, thus getting to know them better. It also allows for greater integration across the curriculum. Teachers serving as advisors and counselors has become more prevalent, so that adolescents can develop relationships with adults other than their parents. To create smaller learning communities in often-large middle schools, "schools within schools" have been created, in part through the teaming approach just discussed. This is particularly likely to occur for the youngest group in a middle school, be they fifth graders, sixth graders, or seventh graders. Cooperative learning practices are used more frequently, in part to reduce the use of ability grouping or tracking. Such practices, when implemented appropriately, enhance relations between teachers and students and have been shown to be effective in enhancing student engagement and learning (Arhar, 1997; Lee, Bryk, & Smith, 1993).

We also find very important the recommendations focusing on the need to engage more fully families and communities in middle schools. A great deal of research indicates that when parents are involved in their children’s education children’s achievement and motivation in school are enhanced (see Brough, 1997; Epstein, 1987). Yet many parents are not involved in their children’s education or at the schools, and the involvement that does occur often declines once children reach middle school. Reasons parents are not involved include responsibilities at work, lack of time, poor communication from the school, and (at times) a sense of not being wanted in the school. Brough (1997) described a variety of ways in which middle schools can increase parental involvement, including better communication about school activities, regular communication from teachers about what is occurring in their classrooms, active solicitation of parental involvement, and encouragement of home-school partnerships. The increased parental involvement resulting from such efforts can facilitate students' engagement and learning.

How many middle schools have adopted such changes? Mac Iver and Epstein (1993) reported results of a study of teaching practices in middle schools across the country. They found that many school districts have not
adopted the "school within a school" approach for making middle schools seem smaller. Forty percent of middle schools use tracking for math and English, and 20% use it for all subjects. Seventy five percent of schools have advising periods for students, although Mac Iver and Epstein noted that many of these are used primarily for school business, such as attendance taking and announcements, rather than for "true" advising and counseling. Close to 40% of middle schools reported using some kind of interdisciplinary teaming, but few of these schools allowed for team planning periods. Only 10% of the schools have teaming programs that allow teachers regular times for planning their academic programs. It should be clear from these data that implementation of the recommendations is occurring slowly. Mac Iver and Epstein asked principals to forecast how their schools would change over the next few years. Principals were most likely to mention teaming with planning periods, students assigned to the same advisory teacher for the entire time they are in middle school, flexible scheduling, and greater use of cooperative learning.

Lipsitz and her colleagues (1997) discussed middle school reform efforts across the country. They focused in particular on three sets of middle schools in Illinois, Michigan, and Indiana in which reform efforts in line with the recommendations included in Table 1 have been undertaken in meaningful ways. Felner, Jackson, Kasak, Mulhall, Brand, and Flowers (1997) reported systematic evaluations of the schools in the Illinois network. They conducted longitudinal studies in schools implementing fully the recommendations from the Carnegie Council, comparing them with schools implementing the recommendations to a degree and not at all. The comparison schools were matched carefully on demographic and other characteristics. Felner et al. obtained measures of students' achievement, school attitudes, and behavior problems. Preliminary analyses indicate that schools in which the implementation has been fullest have higher achieving students. Students in these schools report higher self-esteem and fewer worries about bad things happening to them in schools, and teachers report fewer behavior problems. These results provide encouraging support for the efficacy of the reform efforts. One crucial point made by Felner et al. is that comprehensive reform is what needed. Schools in which one or two of the recommendations have been implemented and schools in which the implementation of several recommendations has proceeded slowly have not been as successful. Unfortunately, as noted above many schools are just beginning to implement change or are doing so selectively.

In summarizing middle school reform efforts Midgley and Edelin (1998) argued that many middle schools have improved the climate of their school, particularly relations between teachers and students, but fewer have changed their instructional practices. They argued for the need for both kinds of changes to occur for reform to occur more completely and, therefore, for adolescents' achievement and motivation to improve. Their position thus is similar to that of Felner et al. (1997): full implementation of reforms is needed
to affect student outcomes. They further discussed how some have suggested that the focus on improving teacher–student relations has come at the expense of improving academics, and stated strongly that it is not necessary to view these two aspects of change as competing with one another. Both are necessary to do, and can be done together.

What about students’ motivation in reformed middle schools? Unfortunately there is not yet a great deal of information about how reform efforts have affected students’ motivation. Felner and his colleagues measured self-esteem, but not the different aspects of motivation we have discussed in this chapter. Some researchers have assessed motivation in their work in reformed middle schools, and we close this section by discussing their work. Mac Iver and his colleagues began a middle school reform effort that they call Talent Development middle schools (see Mac Iver, Mac Iver, Balfanz, Plank, & Ruby, 2000; Mac Iver & Plank, 1997, for a summary). This project is focused on reforming middle schools that serve early adolescents who are at risk because of the backgrounds from which they come. The program involves the implementation of many of the recommendations discussed in this section: detracking the schools, using cooperative learning extensively, team teaching, offering a challenging core curriculum (including algebra) to all students, and providing advising services. The program began in a few schools in Philadelphia, and is spreading to other areas of the country. Results to date for both achievement and motivational outcomes are encouraging. Students in the Talent Development schools gained more in mathematics and reading achievement than did students in matched control schools. Mac Iver and colleagues measured several motivation outcomes, including students’ perceptions of their effort, sense of ability, and valuing of school learning, and students in the Talent Development schools were more positive in these aspects of motivation. They also perceived their teachers as more caring.

Maehr and Midgley (1996) presented an account of their collaborative effort to change the culture organization of a middle school using principles from achievement goal theory. Through collaborations with teachers and school administrators different practices in the school were changed to facilitate mastery rather than ability-focused goal orientations. The specific basis for the change was Ames’ TARGET program. Ames (1992) discussed how classroom grouping and other practices influence students’ achievement goal orientations and other aspects of motivation. Ames, following Epstein (1988), focused on the following aspects: classroom tasks, authority structure, recognition, grouping, evaluation, and time, using the acronym TARGET to describe them. Each of these aspects can influence whether students develop a task mastery or performance goal orientation. In describing these influences we focus on practices that facilitate a mastery goal orientation. Tasks that are diverse, interesting, and challenging foster students’ mastery goals, as do tasks students think they have a reasonable chance to complete. When the authority in classrooms is structured such that students have opportunities to
participate in decision making and take responsibility for their own learning, they are more mastery oriented. Recognition of student effort instead of only ability and giving all students a chance to achieve recognition (rather than just the "best" students) foster task-involved goals. Mastery goals are fostered when cooperative grouping is used and students have opportunities to work with a heterogeneous mix of students. When teachers evaluate students' progress and mastery rather than just their outcomes, and provide students opportunities to improve, then mastery goal orientations are more likely. Finally, time refers to how instruction is paced. Crucial things for fostering mastery goals are varying the amounts of time available for different students to complete their work and helping students learn to plan their own work schedule and organize how they progress through the work. Ames (1992) argued cogently that such practices will allow more students to remain positively motivated in the classroom, in that they will have more positive competence beliefs and task-involved goals (see also Stipek, 1996).

The school—university team worked extensively in one elementary school and one middle school to restructure the schools toward a focus on mastery goal; they spent 3 years in each school. The schools were in a working class community in the Middle West. The researchers met extensively with teachers and administrators at the school to develop collaborative working relationships. Together with the teachers and administrators they developed plans for reorganization and implementation of the plans. At the middle school they focused on creating teams of teachers, “schools within the school,” and changing the student recognition patterns.

Maehr and Midgley's account of the process of attempting to reorganize the school is fascinating. They were able to work with teachers at the elementary school and implement agreed-on changes much more easily than they were at the middle school. At the middle school there were many difficult issues that the researchers encountered throughout the process. These included some teachers' (especially the math teachers) resistance to change, particularly with respect to doing away with grouping, difficulties in adjusting the rigid middle school bell schedule to accommodate teaming and flexible class scheduling, and parents' objections that their high-achieving students did not receive enough recognition. These difficulties illustrate the continuing challenges inherent in school reform efforts.

What kinds of effects did the changes have? Despite the difficulties in implementing some of the proposed changes at the middle school level, the changes appear to have had positive effects on students' motivation. Anderman, Maehr, and Midgley (1999) reported results of analyses obtained from students in elementary and middle schools, in both the collaborating middle school, and a comparison middle school in which the changes did not occur. Indeed, in the comparison school competition and ability grouping were emphasized. There were few differences in students' motivation during elementary school. Following the transition to middle school students in the
Students' Motivation During the Middle School Years

The comparison school had stronger performance goals and extrinsic goals for learning. These students also perceived a stronger emphasis in their school on performance goals. These shifts in students' motivation did not occur for the students in the collaborating school.

In summary, reform efforts organized by a guiding set of principles are underway in middle schools across the country. However, despite the call for these changes and agreement on the principles to guide change, many middle schools have been slow to adopt them or have not changed at all. There is an urgent need for these reform efforts to move ahead. Evidence from schools adopting the recommended changes suggests students' motivation is enhanced in these middle schools; thus the decline in student motivation that we have been discussing is not inevitable. This evidence is still sketchy, however; much more work is needed on how middle school reform efforts are influencing students' motivation along with their achievement.

GENDER DIFFERENCES IN MOTIVATION AND SELF-CONCEPT AT EARLY ADOLESCENCE

In our discussion of change in motivation and self-concept we have discussed overall change. An important question is whether the changes occur in similar ways for all children. In our own work we have been interested particularly in sex differences in children's motivation. Though sex-typing itself occurs in the preschool years (see Ruble & Martin, 1998), several researchers have suggested that engaging in gender-role appropriate activities may become quite important to early adolescents, as they try to conform more to gender-role stereotypes once they enter puberty (Eccles, 1987; Hill & Lynch, 1983). Hill and Lynch labeled this phenomenon "gender-role intensification." This phenomenon may lead early adolescents to have less positive beliefs and be less involved in activities that they see as less appropriate to their own gender. For instance, girls who believe that math is not appropriate for females, and who wish to conform to perceived feminine roles, may decide to discontinue taking math when that possibility becomes available, even if they are doing very well in math.

Regarding the motivation constructs we have discussed in this chapter, there are many gender differences in children's competence beliefs for activities in different domains (see Wigfield, Battle, Solomon, & Eccles, 2002, for more detailed discussion). These differences are intriguing in light of evidence that actual achievement and test score differences between boys and girls are decreasing. In an important article Linn and Hyde (1989) presented a meta-analysis of work on sex differences in verbal, mathematics, and science aptitude test performance. They concluded that sex differences in verbal ability now are negligible; differences in quantitative skills show that girls'
computation skills are better at all ages and boys do better on mathematics conceptual "word" problems in high school, though again these differences have decreased in the past 15 years; and differences in science knowledge and process still favor boys, though they also are decreasing and appear to reflect experiential differences between boys and girls in science.

Despite these findings, gender differences in self-perceptions and values remain. In our work adolescent boys have higher competence beliefs for sports and math than do adolescent girls, and the girls have higher competence beliefs for English (see Eccles et al., 1983, 1989; Wigfield, et al., 1991). Marsh (1989) also reported many gender differences in response to his self-concept scales, though he noted that the gender differences explain only about 1% of the variance in responses. As in our work, boys' math self-concept of ability scores are higher than those of girls, whereas girls' scores are higher for verbal/reading and general school subscales. Interestingly, there are few age x sex interactions in children's and adolescents' responses to our measures or those of Marsh, suggesting that the gender differences neither increase nor decrease in magnitude across age. A recent longitudinal study has found similar declines in boys' and girls' competence beliefs across grades 1 through 12 (Jacobs, Hyatt, Eccles, Osgood, & Wigfield, in press).

We also have found differences in boys' and girls' valuing of different tasks (assessing the different components of achievement values described earlier). Girls value English and reading more than boys do. Interestingly, during middle school there are no differences in the valuing of math (Eccles et al., 1989; Wigfield et al., 1991). Though it is encouraging that boys and girls like math similarly and think it equally important, the fact that girls have less positive views of their ability in math could be problematic. The doubts girls have about their math ability likely leads them to be less likely to continue taking math courses as math becomes more difficult. Although there currently are few course enrollment differences between boys and girls in high school, substantial differences remain at the college level. Boys' devaluing of reading also is problematic, because of the importance reading plays in so many academic endeavors.

Researchers also have examined sex differences in self-esteem, and discussed whether girls' self-esteem becomes less positive than boys' self-esteem during early adolescence. Rosenberg (1986) suggested that girls are more affected by the physical changes occurring at puberty and thus their self-concepts are more volatile than those of boys during this period. Simmons and Blyth (1987) found that the junior high transition had a negative effect only on girls' self-esteem; our own work did not replicate this finding (Eccles et al., 1989; Wigfield et al., 1991). However, in our studies (e.g., Eccles et al., 1989; Wigfield et al., 1991) and those of others, boys report higher self-esteem than do girls during the early adolescence period (e.g., Blyth et al., 1983; Marsh, 1989; Simmons et al., 1979). We are unsure whether this finding reflects "true" gender differences in self-esteem or response bias, as boys tend
to be more self-congratulatory than girls in their responses to self-report measures, while girls may be more modest in their self-reports.

Various authors have argued that early adolescence is a particularly challenging time for girls' self-development as they come to terms with their roles in society. Gilligan and her colleagues have written extensively about this topic (e.g., Gilligan, 1982, 1993; Gilligan, Lyons, & Hammer, 1989), discussing how many girls lose their "voice" at early adolescence. They postulated that this occurs because as they mature, girls learn that females' roles in our society are limited and that the stereotype is for women to be pleasing to others, unassertive, and quiet. Further, Gilligan and others have argued that relations with others are primary to adolescent females and women, leading them to be strongly motivated to preserve positive relations with others. Still others have posited that schools are biased in ways that favor boys' expression of their voices and the suppression of girls' voices (American Association for University Women, 1992). As a result of these changes adolescent girls may suppress their true views of things to maintain relations with others and conform to the cultural stereotype; hence they lose their voice. Gilligan based her conjectures on interviews with adolescent girls in different settings.

Gilligan's work has been influential, influencing views expressed in the popular press describing the difficulties many adolescent girls face (e.g., Pipher, 1994). Although Gilligan's interviews provide some support for her views, Harter, Waters, and Whitesell (1997) argued recently that there is not a lot of documentation for the claim that many females lose their voices at early adolescence. They also suggested that there is a great deal of overlap between boys and girls on a variety of self-related constructs relevant to this issue. In an intriguing series of studies they examined both boys' and girls' voice at early adolescence, as measured by a questionnaire they developed. The questionnaires asked the adolescents they extent to which they felt they could express their opinions and beliefs in different situations. One issue they examined was which relational context the adolescents felt they were able to express their voice. Both boys and girls felt they were freer to express themselves with their peers than with teachers or parents, a finding that perhaps is not surprising.

Harter and her colleagues also have looked at how expression of voice varies by age and gender and gender-role orientation. In cross-sectional studies they have found no evidence for a decline in girls' expression of voice across 6th through 12th grades; this result conflicts with the idea that girls' voices are silenced at early adolescence. Further, in both middle and high school there were no gender differences in voice. However, there were gender-role differences in certain relational contexts. Feminine girls were less expressive in school than were androgynous girls, especially with male classmates. With parents and close friends, however, there were no differences between these groups.

This work suggests that Gilligan's claims about loss of voice at adolescence for girls are too broad; if voice is lost at adolescence it appears to be for a
subset of girls, those who endorse a traditionally feminine sex-role orientation. The different methodologies used in Gilligan's and Harter's work perhaps make direct comparisons difficult. However, we concur with Harter and colleagues that Gilligan's conclusions about voice likely are too general. In future research perhaps new methodologies can be developed to reconcile these conflicting findings.

Hoff Sommers (2000) recently published an even stronger critique of Gilligan's work in the *Atlantic Monthly*, criticizing the methodologies used by Gilligan and arguing that little of her work has received strong peer review. She argued further that boys really are the ones at greater risk, reviewing evidence that boys have lower grades in school, are more likely to drop out, are less likely to attend college, and are much more likely to be diagnosed as learning disabled or having attention deficit disorder, among other things. She concluded that the concern about girls is misplaced and that schools really should worry more about boys. Although some of her critiques of Gilligan's work are justified and her points about the difficulties many boys face are well-taken, it is perhaps unfortunate that this debate is being cast in this way. Rather than arguing either that boys have problems and girls do not, or girls have problems and boys do not, it seems that some members of each gender experience challenges that need attention in school. These challenges are quite different, and so as a result the same solutions will not work for each. For instance, many boys' performance in reading needs to be enhanced for them to achieve better in school. The need for greater participation by girls in mathematics and science-related careers also seems essential, particularly as more and more of the high-paying positions generated by the "new economy" require these skills. It therefore does not seem appropriate to focus primarily on either gender, but rather to deal with the separate issues that each gender group faces.

In sum, despite evidence that males' and females' performance in math and English is becoming more similar, gender differences in competence beliefs and values regarding these subjects remain. At early adolescence girls appear to have lower self-esteem than boys do. The question of whether the transition to middle school has stronger negative effects on girls than on boys has received some support in the literature, but the evidence is not always consistent with this view. And although some girls may lose voice at adolescence, the claim that most girls do so appears to be too sweeping. Many boys also experience difficulties in adjusting to school and performing well in certain subjects. To connect this work to that reviewed in the previous section, researchers should examine how middle school reform efforts impact motivation and self-esteem of both boys and girls, to see what kinds of impact these reforms are having on both groups.

To conclude, we have reviewed work on how motivation and self-concept change at early adolescence, discussing how aspects of school and classroom environment can produce the observed changes. We also discussed the still nascent work on how middle school reform efforts are influencing early adoles-
Students' Motivation During the Middle School Years

These reforms appear very promising, and results of some of the early evaluations of their effects have been quite positive. Continuing such work is a priority for the new millennium.

Teachers' Questions and Answers

Q: I teach in a large middle school where we try to arrange things to accommodate the large numbers of students. For example, to deal with the problem of moving so many kids through their day without overcrowding the cafeteria we use things like different bell schedules for different subject departments. But I wonder if such practices only create more distractions for students.

A: A number of the recommendations for change would seem to be especially important in large middle schools. Research increasingly has shown that when a sense of community and belonging is present in schools, students are more engaged and achieve better. This sense of community is more likely to be lacking in very large schools, as students likely often feel lost in the crowd in these schools. Creating smaller learning communities, organizing instruction by teams rather than departments, and providing other ways to connect students to these schools seems crucial in these kinds of institutions. With smaller learning communities and teams of teachers, bell schedules could be adjusted within the teams. Doing so may be more challenging than in smaller schools, but it might be even more important and provide stronger benefits.

Q: I am worried that my students are being damaged by our current practice of giving them so many high-stakes tests throughout the year. I'm particularly worried that the lower scoring and anxious students are losing motivation as a result. Does any research document this and provide ideas on how to combat these effects?

A: Many motivation theorists and researchers are quite concerned about the impact of high-stakes testing on students' motivation, and think that such testing can undermine many students' motivation. Two particular concerns are what will happen to anxious students and to those performing poorly. Anxious students often are quite stressed by tests, and their level of stress increases as the stakes of testing are raised. Low achievers likely fail many items on the tests, making it more likely that they will doubt their abilities. I don't think systematic work has been done yet to determine exactly what the effects of high-stakes testing on motivation are, but certainly for both these kinds of students they are not likely to be positive. To support students, a number of things can be done. One is to help anxious students deal with the pressures of testing by giving them ideas about how to approach the test (e.g., doing the ones you can first, not dwelling too much on items that pose serious challenges for students, giving students ways to relax while they are taking tests). Lower-achieving students who feel like giving up may be less likely to do so if they
experience success in other tasks and activities in school. Emphasizing to them the importance of effort and use of good strategies while working on the tests may help them avoid the sense that they simply lack ability.

Q: If students lose self-esteem when they go through middle school, should we be taking steps to bolster it? If so, might this detract from our efforts to boost their achievement?

A: Fostering a positive sense of self-esteem in students is a worthy goal at all levels of education, because high self-esteem relates to a number of important mental health and other outcomes. However, the development of a positive sense of self in school needs to be done in the context of legitimate accomplishments; students’ sense of themselves needs to be grounded in this way. Students’ self-esteem (and other aspects of their beliefs about themselves) need to have a stronger foundation than simply being told they are great. A sense of self that is not based in accomplishments can be hollow, and may crumble when challenges are faced.

Efforts to enhance self-esteem and efforts to increase academic rigor and performance need not be in opposition. As Midgley and Edelin (1998) noted, efforts to improve the climate of school, students’ sense of belonging there, and their self-esteem are crucial parts of middle school reform efforts. Efforts to increase academic rigor and student achievement also are central to reform. The two can be complementary rather than in opposition to each other, and indeed should be complementary.

References


8. Students’ Motivation During the Middle School Years


On an early autumn morning the second graders cheerily exchange greetings as they enter their classroom, hang up their jackets, and prepare to start their day. Dan immediately goes to his desk and looks toward the chart that poses the "problem of the day," a challenging mathematical activity the children routinely do when they arrive each morning. He pulls out his math journal, and begins to read the problem and contemplate his solution. Chris, on the other hand, walks around the classroom awhile before going to his desk. When finally seated, he pulls out a toy dinosaur to examine. Seeing the other children at his table working in their math journals, he half-heartedly retrieves his journal from his desk and glances briefly at the Problem of the Day chart. He never actually gets around to writing anything down.

Dan and Chris are real students. Their names have been changed, but they are actual second graders. Although they are equally intelligent boys, there is a vast difference in their approaches to academic tasks and, as a result, a widening difference in their levels of academic attainment as well. What is it that has
created this dichotomy? What can his teachers do to ensure that Dan will continue with his positive level of engagement? What can be done to encourage Chris to become more successfully engaged?

Scenarios such as the above are a daily occurrence in classrooms. These questions about student differences have intrigued and perplexed parents, teachers, and researchers alike as long as there has been formal education. The answers are not simple. Individual differences have many bases, including personality traits, ability, experience, family and personal expectations, and environmental factors. All of these factors interact to influence motivation, an integral part of students’ school performance. But increasing evidence suggests that an additional factor, adults’ and children’s beliefs about their ability to perform a task, exerts a powerful influence over their motivation for that task. According to Bandura et al. (1996), “Among the mechanisms of personal agency, none is more central or pervasive than people’s beliefs in their capabilities to exercise control over their level of functioning and environmental demands” (p. 1026). The construct of self-efficacy has thus emerged as a strong predictor of behavior.

**SELF-EFFICACY**

Just what is self-efficacy? Perceived self-efficacy refers to individuals’ beliefs about their ability to execute a particular performance (Bandura, 1986). Many people assume self-efficacy is the same as self-concept or self-esteem, but it is not. Self-efficacy is distinct from other conceptions of self in that it involves judgments about capabilities specific to a particular task. Pajares (1997) defines self-efficacy as “a context-specific assessment of competence to perform a specific task” (p. 15). Self-concept is a more global construct that contains many perceptions about the self, including self-efficacy. Self-concept is developed as a result of external and internal comparisons, using other people or other aspects of the self as frames of reference. But self-efficacy focuses on ability to successfully accomplish a particular task with no need for comparisons: the question is can I do it, not would others be successful (Marsh, Walker, & Debus, 1991). Also, efficacy beliefs are strong predictors of behavior, but self-concept has weaker predictive power (Bandura, 1997).

Compared with self-esteem, self-efficacy is concerned with judgments of personal capabilities; self-esteem is concerned with judgments of self-worth. Self-esteem and self-efficacy are not perfectly correlated. It is possible to feel highly efficacious in one area and still not have a high level of self-esteem, or vice versa. For example, you may have low self-efficacy for singing, but your self-esteem would not be affected if your life did not require singing. But if you were a teacher and your self-efficacy for teaching started dropping after several bad experiences, it is likely that your self-esteem would suffer too. So self-
efficacy for a particular task affects self-esteem only if the person values that task.

**Sources of Self-Efficacy**

Bandura identified four sources of efficacy expectations: mastery experiences, physiological and emotional arousal, vicarious experiences, and verbal persuasion. *Mastery experiences* are our own direct experiences—the most powerful source of efficacy information. Successes raise efficacy beliefs whereas failures lower efficacy. Level of *arousal* affects efficacy, depending on how the arousal is interpreted. As you face a task, are you anxious and worried (lowers efficacy) or excited and “psyched” (raises efficacy) (Bandura, 1997; Pintrich & Schunk, 2002).

In *vicarious experiences*, accomplishments are modeled by someone else. The more closely you identify with the model, the greater the impact on efficacy. When the model performs well, your efficacy is enhanced, but when the model performs poorly, efficacy expectations decrease. Although mastery experiences generally are acknowledged as the most influential source of efficacy beliefs in adults, Keyser and Barling (1981) found that children (sixth graders in their study) rely more on modeling than mastery as a source of self-efficacy information. Similar peers (similar in age, competence, and in certain situations, gender) make the most powerful models (Schunk, 2000).

*Verbal persuasion* may be a “pep talk” or specific performance feedback. Verbal persuasion alone cannot create enduring increases in self-efficacy, but a persuasive boost in self-efficacy can lead an individual to make an effort, attempt new strategies, or try hard enough to succeed (Bandura, 1982). Verbal persuasion can counter occasional setbacks that might have instilled self-doubt and interrupted persistence. The potency of persuasion depends on the credibility, trustworthiness, and expertise of the persuader (Bandura, 1986).

Examples might be helpful in explaining each of the four sources of efficacy. If a student earns a perfect score on a spelling test, that mastery attainment will increase his efficacy for getting a perfect score on the next spelling test. After watching one of her classmates correctly solve a two-digit subtraction problem, a vicarious or modeling experience, a second grader may raise her belief that she can solve a similar problem. A teacher’s words of encouragement such as “You figured out all of the words on that page by yourself! I’ll bet you can read the next page just as well” can influence the student’s efficacy for successfully reading a page of similar difficulty. On the other hand, efficacy sources can also be negative. If a student has a strong physiological reaction to a task, such as a pounding heart and sweaty palms as she begins to give an oral report, she may conclude that report giving is a difficult task that she cannot perform successfully. Each of the four sources may either raise or lower self-efficacy judgments, depending on the interpretations made by a particular individual in a particular situation.
Impact of Efficacy Beliefs

Highly efficacious students tend to select more challenging tasks, put forth more effort to successfully accomplish tasks, and persist longer when tackling difficult tasks (Bandura, 1997; Schunk, 1990). Students with low levels of efficacy may choose only easy tasks or avoid a task altogether, apply minimal effort, and give up easily. Even when students have the same level of academic skills, those with higher self-efficacy for the task perform better on schoolwork (Zimmerman, 1995).

Self-efficacy would be one of the first factors to consider in explaining Dan's and Chris' approaches to the Problem of the Day, as well as the differences in their overall school performance. What might have caused these two boys to form such contrasting sets of beliefs about their abilities for school success? The similarities between Dan and Chris are striking in many respects. Both boys are being raised by their mothers in single-parent homes. Both have one sister, 3 years older, and no younger siblings in the home. Their sisters are conscientious and capable students. Both Chris and Dan are bright and articulate, have pleasant personalities, are polite and cooperative, and are well-liked by their peers.

There is, however, an important difference between the two boys. Chris has a physical disability that resulted in several surgeries since his birth, frequent bouts of illness, and some physical limitations. From a very early age, he lagged in physical development and stature. It is reasonable to assume that many expectations were lowered for Chris in light of the physical struggles he faced. Although his physical disabilities had no direct impact on his mental ability, it is quite possible that his self-belief system was strongly influenced by related consequences. It is likely that Chris began to get early messages, both at home and later at school, that it was acceptable for his performance level to be less than that of students with no disability.

Compared with many students with low levels of efficacy for school performance, Chris's case is more understandable and maybe even predictable. Regardless of the causes, however, it is important for teachers to do whatever they can to facilitate development of positive levels of self-efficacy in all of their students. Clearly, any courses of action that enhance children's efficacy could improve their odds for achieving success.

Importance of the Primary Grades

Children entering first grade already show a wide range of individual differences. And yet, because their self-beliefs for school success and their efficacy for cognitive learning are so undeveloped, they undoubtedly are at their most malleable stage because efficacy is most malleable early in the learning experience (Bandura, 1997). After third grade, academic work becomes increasingly demanding. What happens to students in the first few years of school will lead
9. Self-Efficacy and Self-Regulated Learning

them to develop self-beliefs that will become increasingly stable as they con- 
front more demanding work. "Because of the formative aspect of these early 
school years and this shift in academic expectations beyond third grade, many 
preventive programs define kindergarten through third grade as the window in 
which children build the foundations of successful school careers" (Perry & 

Even though the foundation for future success or failure is built in the 
primary grades, relatively little research directly explores self-efficacy under 
fourth grade. Some educational psychologists suggest that children in the early 
grades rarely reflect on their own performance (Paris & Newman, 1990). Chi-
ldren do, however, construct implicit beliefs and concepts about their abilities; 
these beliefs mediate their learning. Early on, children develop their personal 
thories of schooling, often based on social interactions in the classroom, that 
influence their actions at school and either foster or impede academic achieve-
ment. Besides beliefs about their academic abilities, they also form beliefs 
about the nature of academic tasks, cognitive strategies, social dispositions of 
others, and expectations for their own success. These ideas develop concur-
There are cumulative effects as children move from the primary grades into the 
intermediate grades.

**Characteristics of Young Children That Affect Efficacy Judgments**

If preschool and primary teachers are serious about promoting self-efficacy 
beliefs, it is important that the teachers have a basic understanding of young 
children's common characteristics and conceptions about competence. The 
following sections describe several of these characteristics and conceptions.

**Modeling: Social and Cognitive Comparisons**

Watching other children and comparing themselves with their peers provide 
important information as children begin to make self-judgments. As children 
mature, they become increasingly discriminating in their use of comparative 
efficacy information. Around age 6, children begin to realize that the most 
informative comparisons are made with others who are like themselves but 
slightly better (Bandura, 1986). So primary grade children are becoming more 
skilled at making accurate judgments about their abilities by comparing them-
themselves with other young children.

Cognitive modeling can be used to increase children's skills in making 
efficacy judgments. In cognitive modeling, individuals think aloud as they 
solve problems or make judgments so that their thought processes are observ-
able (Meichenbaum & Asarnow, 1979). Both the student who is doing the 
cognitive modeling and the observers can benefit from this strategy. For
example, a student might be required to talk through the steps used to solve a word problem in math. During this modeling process, the teacher or a peer tutor can point out all of the steps that the student is performing correctly, thus highlighting mastery experience. The student can be encouraged to attempt difficult steps with support and coaching from the teacher or a peer (verbal persuasion), and given feedback along the way that notes how the student’s effort leads to success and how success reflects ability. By reviewing how the student handled the task and overcame difficulties to succeed, teachers help students learn to interpret and integrate efficacy information (from mastery experience, verbal persuasion, or other sources) on future tasks that are similar. Children who observe the model will learn how to use relevant cues for assessing their own ability to perform the task successfully.

**Attention to Immediate Outcomes and Efficacy Accuracy**

Piaget’s (1963, 1970) work on cognitive and perceptual development demonstrated that children of about 6 and younger were unable to focus on more than one dimension of a problem or situation at a time. Bandura (1986) suggested that this limitation causes young children to rely on immediate and conspicuous outcomes for their self-appraisals. A note written on a first or second grader’s paper telling her that her writing is messy may not be helpful for improvement of her writing or for her efficacy for neat handwriting. Monitoring her writing and reminding her to make sure that her lines do not go below the baseline on her writing paper and noting how much neater her writing looks when she stops on the line provide concrete cues both about how she can improve the appearance of her handwriting and how she can judge the writing she does on her own in the future. When one new handwriting technique is mastered, another can then be introduced.

Another reason why children are less accurate in their efficacy judgments than adults may be because the children are less advanced in their cognitive development. As they mature, children develop their abilities to consider increasingly complex data and use greater logical reasoning to make efficacy judgments. For example, Kaley and Cloutier (1984) found that efficacy estimates of fifth and ninth graders predict their behavior more accurately than the efficacy estimates of first graders predict these younger students’ actions. We have found, however, that when students are given a concrete task at the appropriate developmental level, second graders can make quite accurate efficacy predictions (Gaskill, 2000).

**Misconceptions: Equating Social and Academic Abilities**

Investigations of young children’s early beliefs about their competence reveal some surprising misconceptions. Most of the misconceptions are related to
the children's limited cognitive development. To encourage early positive efficacy beliefs rather than undermine them, it is important for teachers to be aware of some of the differences between the ways that younger children and older children interpret information about their competence. Let us consider a few of these differences and misconceptions.

One of the striking misconceptions is that young children often confuse academic ability and social behavior. When Stipek and Tannatt (1984) asked preschoolers to tell which of their classmates were smart, more than half of them mentioned children who behaved appropriately by staying in their seats, obeying the teacher, and not teasing others. Blumenfeld, Pintrich, Meece, and Wessels (1981, 1982) found that first graders believed that the children who shared were average or smart, and those who received criticism were less capable. These young students were unable to separate behavioral from academic feedback. They related being smart to paying attention, finishing work, and not fooling around; they felt more guilty about inappropriate behavior than fifth graders did. Stipek and Tannatt (1984) found that kindergarten through third grade children were significantly more likely to refer to work habits than preschool children when assessing their ability, although this may be a socially constructed belief based on teacher emphasis on effort.

Interpretations of Teacher Actions

There also may be developmental differences in how children use praise and blame as cues about competence. For example, Barker and Graham (1987) found that 5-year-olds perceived praised students to be more able and blamed students to be less competent when compared with students who received neutral feedback. The result reversed as students got older: praised students were seen as less able and blamed students as more competent. Older children may see criticism as a signal from the teacher that the criticized student has the ability to do better, whereas praise can communicate, "You poor child, you did well considering your limited abilities." Brophy (1985) calls this "praise as a consolation prize" for failing.

A similar age-related difference is associated with strategies used by children to interpret the meanings of their teachers' actions, including teacher attention and expressions of liking or warmth. For example, 6- and 7-year-old students believed that a student who was hugged by his teacher was smarter than an unhugged student, but 10- and 11-year-olds reached the exact opposite conclusion (Lord, Umezaki, & Darley, 1990). That is, the older children interpreted the hugs as a sign of sympathy, indicating that the teacher did not believe the hugged child had the ability to perform as well as the unhugged child. By the same token, Graham and Barker (1990) found that when teachers gave unsolicited help to students, it signaled that the receiving children were less smart and less likely to be successful in the future.
Effort and Ability Beliefs

As described by Dweck (Chapter 4 in this volume), adults use two basic concepts of ability. An entity view of ability assumes that ability is a stable, uncontrollable trait—a characteristic of the individual that cannot be changed. According to this view, some people have more ability than others, but the amount each person has is set. An incremental view of ability, on the other hand, suggests that ability is unstable and controllable—an ever-expanding repertoire of skills and knowledge (Dweck & Bempechat, 1983, p. 144). By hard work, study, or practice, knowledge can be increased and thus ability can be improved.

Young children tend to hold an exclusively incremental view of ability: ability can be improved by effort because hard work is high ability (Nicholls & Miller, 1984). Thus through the early elementary grades, most students believe that effort is the same as intelligence. Students who work harder are seen as more capable, a phenomenon labeled the "halo schema" (Kun, 1977). If you fail, you are not smart and you did not try hard; if you succeed, you must be a smart, hard worker (Stipek, 2002). Equating effort and ability can be seen as a positive belief because all children can perceive of themselves as capable as long as they try hard. The emphasis on effort by young children requires less continuous comparison with others: you know that you are capable as long as you are working hard. Thus ability is more under the individual's control (Rosenholtz & Simpson, 1984).

Unfortunately, cognitive growth—along with all its positive effects—brings negatives as well. Children of 11 or 12 begin to differentiate among effort, ability, and performance. Thus fifth and sixth grade students begin to infer that having to exert more effort must reflect less ability: if you were really smart you would not have to work hard at all (Lord et al., 1990). So older students may protect their self-esteem about ability by avoiding the appearance of working hard, a strategy that will undermine learning and thus diminish self-efficacy in the long run.

Another advantage of maintaining the incremental view that intelligence is malleable and that effort improves ability is the adoption of learning goals (Dweck, 1986; Chapter 4 in this volume). Children with learning goals try to increase their competence and to understand or master something new, whereas children with performance goals focus on making good impressions or avoiding negative judgments of their ability. Working toward learning goals is characterized by seeking challenge and persisting when confronted with obstacles, but embracing performance goals results in low persistence and avoiding challenge.

What can we conclude as teachers? Because children in the primary grades naturally take the incremental view, helping them to maintain that view as long as possible is important for the development of positive self-efficacy (Nicholls, 1978; Schunk, 1983). Unfortunately, as children progress through the grades,
they increasingly conceive of ability as a stable and inherent trait and they sometimes see effort as signaling low ability, due in part to the social comparisons that permeate school testing and grading practices. If students judge their own ability to be inferior and avoid effort because it signals low ability, efficacy beliefs are impaired.

We have covered many possibilities for helping young children to raise their judgments of academic efficacy. Knowing how to seamlessly embed efficacy information into routine classroom instruction is an important teacher tool. Let us take a look at some strategies that were used to improve Chris’ efficacy for the Problem of the Day activity. First of all, it was necessary for Chris to encounter some positive experiences with the task in a supportive climate. At the beginning of each math class, the procedure was to go over the day’s problem together and have students share different ways in which they were able to solve the problem. Chris was able to see his peers model and discuss their solutions, an important vicarious experience.

In addition, the teacher sometimes asked Chris and other students who had been unable to solve a problem to think about which of the demonstrated solutions they would choose for themselves. In this way they were able to contribute to the class discussions. They were observed and scaffolded as necessary as they then added their solution to their otherwise empty journal page. The teacher provided feedback that focused on the skills that they already had and were able to apply to the process. At the same time, the teacher observed these students for areas of weakness that needed to be addressed in upcoming math lessons. Efforts were always made to keep the climate of the classroom warm and encouraging for all students, not focusing unusual levels of attention on the unsuccessful students, but at the same time acknowledging their ability to solve the problem successfully.

Students like Dan who had successfully solved the problem earlier in the day were encouraged to think about alternative solutions or ones that they thought might be better than their originals. In this way all students’ were being challenged by the Problem of the Day activity. Dan began to challenge himself by coming up with several solutions in the hope of finding ones that no one else would think of, while Chris began to believe that he could successfully participate in the activity. This higher level of efficacy for the task led Chris to more ready engagement on his arrival in the morning. This engagement was a necessary part of skill development that would lead him toward an upward spiral of math success.

For teachers, knowing the sources of self-efficacy judgments and the unique beliefs and misconceptions of children is only half the picture, however, because maintaining efficacy beliefs requires successful actions. As early as the primary grades, teachers should begin to help students to develop strategies that will help them to be in control of their academic behavior. This control will increase their odds of success with school tasks and keep self-efficacy and ability judgments from eroding. For the remainder of this chapter we focus on
the strategies that will help students to become self-regulated learners, in control of their own academic lives.

**SELF-REGULATED LEARNING**

Self-efficacy beliefs and self-regulated learning strategies are interdependent. Both require the presence of specific cognitive capacities, including the ability to set goals, self-monitor, reflect, and make judgments. Both also support personal agency or control. Examining the self-regulated learning skills of primary-aged children is essential for understanding the maintenance of self-efficacy.

What do self-regulated learners look like? They, like Dan in the opening section of this chapter, "approach educational tasks with confidence, diligence, and resourcefulness..., are aware when they know a fact or possess a skill..., (and) proactively seek out information when needed and take the necessary steps to master it" (Zimmerman, 1990, p. 4). Metacognitively, they plan, set goals, organize, self-monitor, and self-evaluate. Motivationally, they take responsibility for successes and failures, are intrinsically interested in the task, and have high self-efficacy, which together lead to greater effort and persistence. Behaviorally, they seek out help and advice, create optimal learning environments, self-instruct, and self-reinforce. Throughout the entire self-regulation process they monitor progress, react, and adapt. This self-oriented feedback loop is at the heart of self-regulated learning. These learners demonstrate self-as-agent as they integrate the cognitive and metacognitive aspects of "skill" with the internalized desire associated with "will" (McCombs & Marzano, 1990).

Thus, in self-regulated learning (SRL), the student must incorporate a combination of cognitive, metacognitive, motivational, and behavioral processes to attain the highest possible level of achievement (Zimmerman & Kitsantas, 1997).

**Interactions between Self-Regulation and Self-Efficacy**

There are two areas of interaction between the development of self-regulated learning strategies and the development of self-efficacy beliefs. First, a student's level of self-efficacy predicts her or his use of cognitive strategies and self-regulation. Use of these strategies then predicts academic achievement (Zimmerman, 1995). This creates a reciprocal relationship, for as students increase their use of learning strategies and their academic performance improves, their academic self-efficacy increases. Self-efficacy perceptions, then, are both a reason to learn and an outcome of learning (Zimmerman, 1990).
Second, both self-regulated learning and self-efficacy judgments require a similar series of cognitive and metacognitive processes, including self-observation, self-judgment, and self-reaction. This process of monitoring strategies and beliefs may be the most significant defining feature of the dynamic duo of self-efficacy and self-regulated learning. Monitoring progress is the critical behavior necessary for making self-judgments. To be motivated by a discrepancy between "where you are" and "where you want to be," you must have an accurate sense of where you are and how far you have to go. If they judge that current efforts have fallen short of the goal, self-regulated learners can exert more effort or even try another strategy. Thus reactions to goal progress motivate behavior (Bandura, 1986). If self-regulated learners see their progress toward a goal as acceptable, not only do they anticipate the satisfaction of reaching the goal, they also feel enhanced self-efficacy and motivation. Deliberate attention to our behavior informs and motivates (Zimmerman, 1990). Young children have difficulty detecting their own errors and monitoring progress, but training can improve their ability to regulate their own strategies (Paris & Lindauer, 1982).

IMPLICATIONS FOR TEACHERS

The previous discussion described the links between the development of self-efficacy and self-regulated learning. In the following sections we examine what teachers can do to foster self-efficacy for preschool and primary grade children and then turn to instructional approaches that build self-regulated learning.

Preschool Children

Two elements—adult expectations and feedback and children’s task selection—interact to enhance the development of cognitive and social skills that are a foundation for an emerging sense of efficacy in preschool children. For our purposes we will isolate some of these contexts and behaviors to discuss them as separate entities, even though the factors likely work together.

Reactions to Adults’ Expectations and Feedback

In studies of toddlers and preschoolers, Stipek, Recchia and McClintic (1992) assessed reactions to success and failure, the effects of praise on children’s reactions to success, and the nature of standards for success set by these young children. Toddlers younger than 22 months displayed positive emotional reactions to success, but there was no negative analog; these toddlers simply changed goals at the first signs of difficulty so they seldom experienced failure. Even though older toddlers recognize and respond to external approval, they do not require praise to feel positive about mastery experiences. Instead, an
“intrinsic, mastery-oriented motivational system predominates throughout the preschool years” (Stipek et al., 1992, p. 73). Preschoolers are able to maintain this mastery system in part because, like toddlers, they can change goals or tasks in their lives outside school, thus avoiding failure situations.

By age 2, children become distressed about failing to meet adult standards in achievement contexts. Frustration, anger, discouragement, and other negative emotional reactions could result when adults impose unachievable goals or remain rigid in their expectations. Children who frequently experience these adult demands may become wary of achievement contexts before they ever enter school because achievement is associated with such negative emotions.

**Task Selection**

Stipek et al. (1992) report on studies showing that even children as young as 2 appear to be more motivated and persistent when tackling tasks they have chosen for themselves. When mothers interfered by limiting their child’s choice and initiative, the children were less motivated to stay on task and generally showed less positive emotions. Results from an anthropological study comparing 4-year-olds from two cultural communities (Tudge & Putnam, 1997) suggest that professional parents are more likely than parents of lower socio-economic status to set goals of independence and control over their environment for their children. Children in the professional group were much more likely to initiate activities and to maintain their involvement in activities, becoming more self-directed even at this early age.

Again, teachers can take heed of these findings. Young children need to be able to initiate their own activities when possible, with the flexibility to change tasks as necessary to avoid failure. Rigid expectations from adults should be avoided.

**Developing Self-Efficacy in the Primary Grades**

In this section we focus on the aspects of classrooms that support student success and thus encourage positive self-efficacy judgments. Keeping in mind the four sources of information that influence self-efficacy judgments—vicarious experience, verbal persuasion, physiological states, and mastery experience—we discuss classroom features most likely to provide the greatest impact from each of these sources. We know that there are major differences in self-beliefs and cognitive development along the continuum from kindergarten to third grade. Still we will identify some general classroom features that we believe can positively impact many, if not all, students.

This list of suggestions is by no means new to either parents or practitioners, although to our knowledge it is the first attempt at identifying how classroom activities and climate align with the framework of self-efficacy development.
Even though we have separated these four areas of influence for the sake of our discussion, clearly there are inevitable interactions among them in the classroom. Children derive their self-efficacy information from varying combinations of the four sources, but even then individual cognitive judgments and interpretations of the information ultimately determine the level of self-efficacy.

Facilitating Useful Vicarious or Observational Experiences

Because young children rely so heavily on modeling cues, this source of information should be made available as frequently as possible. Children use modeling of similar others as a basis of comparison for their own performance either to raise or to lower their self-efficacy. Watching like models successfully perform a task motivates a child to do the same. However, if the observer fails to perform the task successfully after watching a model, gains in self-efficacy will be negated. Some ideas for primary grade classroom teachers to use to incorporate modeling experiences include:

- Allow peer models to demonstrate a task, verbalizing their thoughts and reasoning as they perform.
- Encourage peer tutoring when appropriate. Figure 1 is a checklist for guiding students in peer tutoring situations. Young children need to be taught how to be a good tutor and then supported in their efforts. The checklist provides visual cues about how to be a good tutor.
- Provide children with comparative information that focuses on behaviors that support learning: “Look at the way Rhonda keeps her numbers in a line up and down so she doesn’t get mixed up in her addition.”
- Incorporate cooperative learning activities with partners or small groups, establishing goals and expectations for the group prior to their task. See Aronson (Chapter 10 in this volume) for information about one form of cooperative learning, the jigsaw method.
- Use flexible grouping for small group instruction to avoid labeling individuals. Form and reform groups on the basis of students' *current performance* in the subject being taught and change group placement frequently when students achievement changes. Discourage comparisons between groups and encourage students to develop a whole-class spirit. Avoid naming ability groups ("tigers," "sorcerers," "hurricanes," etc.); save the names for mixed-ability or whole-class teams. Organize and teach groups so that low-achieving students get appropriate extra instruction, not just the same material again.

Making Use of Verbal Persuasion

We include all types of verbal feedback as sources of verbal persuasion. Some guidelines include:
Written Prompts: A Peer-Tutoring Checklist

By using this checklist, students are reminded how to be effective tutors. As they become more proficient, the checklist may be less necessary.

- Remember to...
- 1. Have the lesson ready.
- 2. Talk clearly.
- 4. Tell the student when he is right.
- 5. Correct mistakes. STOP! Give the right answer. Have the student do it.
- 6. Praise good work!
- 7. Make the lesson fun.
- 8. Do not give TOO MUCH help.
- 9. Fill out the daily sheet.
- 10. Can you add a suggestion?

FIGURE 1


- Be aware of children’s actual ability to succeed when giving encouragement. Do not say, “You can do that problem—it’s easy.” Instead, suggest that “You might be able to get this one if you take your time and line up the numbers.”
- Provide attributional feedback that focuses on effort: “Your hard work is paying off” or “I’m glad you did this last revision—your story uses more describing words now.”
- Use constructive feedback to enhance future performance. It is more helpful to tell children why they are wrong so they can learn more appropriate strategies (Bangert-Drowns, Kulik, Kulik, & Morgan, 1991). Without such feedback, they are likely to make the same mistakes again. Yet this type of feedback is rarely given. In one study, only about 8% of the teachers noticed a consistent type of error in a student’s arithmetic computation and informed the student (Bloom & Bourdon, 1980). What are the identifying characteristics of effective written feedback? Working with sixth grade teachers, Elawar and Corno (1985) found that feedback was dramatically improved when the teachers used these four questions as a guide: “What is the key error? What is the probable reason the student made this error?
How can I guide the student to avoid the error in the future? What did the student do well that could be noted?” (p. 166).

- Use only sincere praise as children can see through empty praise.

Let us look at teacher praise and reinforcement more closely. Positive results occur when teachers carefully and systematically praise their students. Unfortunately, praise is not always given appropriately and effectively. Merely “handing out compliments” will not improve behavior. To be effective, praise must (1) be contingent on the behavior to be reinforced, (2) specify clearly the behavior being reinforced, and (3) be believable (O'Leary & O'Leary, 1976). In other words, the praise should be sincere recognition of a well-defined behavior so students understand what they did to warrant the recognition. Teachers who have not received special training often violate these conditions (Brophy, 1981).

Brophy's extensive review of praise suggests several guidelines for teachers:

- Be clear and systematic in giving praise. For example, be sure the student understands the specific action or accomplishment that is being praised. Say, "You returned this book on time and in good condition," not "You were very responsible," Recognize genuine accomplishments. Tie praise to students’ improving competence or to the value of their accomplishment. For example, say, "I noticed that you double-checked all your problems. Your score reflects your careful work." Set standards for praise based on individual abilities and limitations. Focus the student’s attention on his or her own progress, not on comparisons with others’ achievements. Attribute the student’s success to effort and ability so the student will gain confidence that success is possible again. Ask students to describe the problems they encountered and how they solved them. Do not give undeserved praise to students simply to balance failures. It is seldom consoling and calls attention to the student’s inability to earn genuine recognition.

**Controlling the Classroom for Positive Physiological States**

Teachers need to work at keeping the level of arousal right for the task at hand. If students are going to sleep, energize them by introducing variety, piquing their curiosity, surprising them, or giving them a brief chance to be physically active. Learn about their interests and incorporate interests into lessons and assignments. If arousal is too great, and students become anxious, consider these strategies for reducing anxiety:

- Use competition carefully. Monitor activities to make sure no students are being placed under undue pressure. During competitive games, make sure all students involved have a reasonable chance of succeeding.
- Avoid situations in which highly anxious students will have to perform in front of large groups. Ask anxious students questions that can be answered
with a simple yes or no or some other brief reply. Give anxious students practice in speaking before smaller groups.

- Make sure all instructions are clear. Uncertainty can lead to anxiety. Write test instructions on the board or on the test itself instead of giving them orally. Check with students to make sure they understand. Ask several students how they would do the first question or an exercise or the sample question on a test. Correct any misconceptions. If you are using a new format or starting a new type of task, give students examples or models to show how it is done.

- Avoid unnecessary time pressures and remove some of the pressures from major tests and exams. Teach test-taking skills; give practice tests; provide study guides. Develop alternatives to written tests. Try oral, open-book, or group tests. Have students do projects, organize portfolios of their work, make oral presentations, or create a finished product.

Because negative thoughts and fears can lower perceptions of ability and contribute to inadequate performances, strive to maintain a classroom environment that creates a positive, caring emotional tone. Here are a few ideas. Maintain a humanistic classroom approach rather than a custodial approach. Emphasize rights and responsibilities rather than rules and regulations. Teach students to assess their own work by providing models and rubrics. Recognize students when they are appropriately self-critical. Avoid competition between students but foster cooperation. Emphasize understanding and learning rather than focusing on right answers. For example, encourage revisions and rewrites rather than grading the only attempt. Use efficient classroom management and organization. Many students become stressed when they do not know what to do or when the class is disruptive. Display a sense of humor, enthusiasm, and warmth toward students and incorporate their ideas and interests into class activities.

Providing Opportunities for Mastery Experience

All students want to be successful, although some have built up defense mechanisms because of previous failures. Guaranteeing successful mastery experiences for all children in a classroom is a weighty endeavor, but one well worth the effort. Some guidelines for teachers include:

- Provide a variety of activities for children with various learning styles, enabling all children to experience success.

- Create daily routines so that children have a sense of expectation and control over their environment. Signal the routines with a daily schedule or other cues so that all students are reminded and know what to do or where to go next.

- Ensure that learning tasks are on an appropriate level for all students. This requires both an intimate knowledge of each student’s performance level
in each subject domain along with the creation of individualized tasks as necessary.

- Create opportunities for students to experience the "practice effect" by providing familiar tasks to improve their performance.
- Plan instructional activities that are interesting, hands-on, and related to real life.
- Provide instructional support as necessary to guarantee student success.
- Help students to maintain incremental views of intelligence and adopt learning goals rather than performance goals. For example, remove performance pressures by giving feedback and then allowing students to redo and improve work, use portfolios so that students see their own progress, periodically revisit earlier assignments to show students how much they have learned, recognize creativity and partially correct answers, not just perfect papers, and avoid comparing students with each other. See Dweck (Chapter 4 in this volume) for other ideas.
- Teach cognitive and metacognitive skills such as planning, monitoring, and goal setting.
- Teach specific self-regulatory strategies that will impact student performance, such as help seeking, maintaining task focus and attention, applying memory strategies, managing time, and organizing.

This emphasis on teaching the self-regulatory skills leads to our final consideration, developing self-regulated learning in young students. How can you address this goal directly?

**Developing Self-Regulated Learning in Primary Grade Children**

Developing strategies that will enable young learners to act as agents for achieving their own success is an important way to enhance their self-efficacy. As Bandura (1997) states:

> It is easier to instill beliefs of personal efficacy if the instruction and informative feedback center on mastery of strategies that enable one to achieve progress rather than only on level of performance attainments. Knowing the means for becoming adept in given endeavors instills a sense of personal control over one's development. (p. 182)

In other words, students must be given some tools that will increase their odds of succeeding if their efficacy is to spiral upward along with their improving learning skills. They need not only the "will" to succeed but the "skill" as well. Although all learners use SRL strategies to some extent, self-regulated learners take it a step further by recognizing the connections between their strategy use and their success. In addition self-regulated learners systematically use these strategies to reach their academic goals. Now we turn to the important question. How can teachers help young children develop self-regulated learning?
Development of Self-Regulation

Over the past two decades there has been substantial research that documents young children’s development of learning strategies. From approximately 5 to 12 years of age children acquire a diverse range of cognitive strategies, including focusing attention, monitoring understanding during reading, and planning study time (Paris, Newman, & McVey, 1982). Zimmerman and Martinez-Pons (1988) developed a list of 14 self-regulated learning strategies, specific to a school context, that have been used with high school and middle school students. Among strategies that are more readily available to younger students, particularly if given training and a rationale for their use, are attention monitoring or maintaining task focus, self-verbalization, help seeking, memory and metamemory skills, time planning and management, and goal setting.

Research is also showing that the schooling experience is a powerful shaper of skills, such as memory skills, in young children. Morrison, Smith, and Dow-Ehrensberger (1995) cite major differences in cross-cultural studies between schooled and unschooled children in the growth of memory skills, among other things. In a study of their own they looked at the growth of memory and language skills of students clustered around their school district’s cutoff date for entrance age, comparing the students who just make the cutoff to begin school with those who just missed. They concluded that the shift in children’s cognitive functioning between the ages of 5 and 7 is “almost exclusively a product of schooling and related experiences, at least in the limited area of memory development studied” (p. 795). The powerful message for educators is that it is their responsibility to provide these experiences for the students in their care.

Instructional Principles

Even though educational psychologists differ in their opinions about how self-regulated learning develops in children (see Winne 1995, 1997), they do agree on some instructional principles. If these principles, in fact, lead to the development of SRL, they should also similarly enhance development of increased self-efficacy for the strategies executed.

- Provide a wide range of opportunities in the form of diverse tasks so that students can experience success and learn that effort pays off.
- Allow practice of new skills to the point of overlearning before introducing and expecting SRL strategies.
- Encourage the epistemological beliefs that learning is difficult and requires effort and that knowledge is rarely absolute.
- Help students to understand the utility of newly acquired strategies and conceptual knowledge.
- Introduce learning and practice of several new procedures at once. Interspersal of practice may increase durable knowledge.
9. Self-Efficacy and Self-Regulated Learning

- Make sure strategy execution during practice is easy.
- Help students to improve monitoring awareness, possibly by prompts to monitor daily lessons.

Perhaps even more basic than these principles are such early self-regulated learning skills as focusing attention, maintaining task focus through to completion, seeking help as needed, and strategies related to task initiation. It was just such strategies that were effective in improving Chris’ math performance. Through the modeling provided by successful students, Chris began to regulate his ability to follow the daily routine of the problem solving task by going directly to his seat, getting his materials ready, and focusing his attention on the problem. As his efficacy for successful solution improved because of his scaffolded experiences during math class, his motivation to engage improved accordingly. It was the combination of both improved efficacy and acquisition of the strategies that provided the necessary interactions to make the gradual advancements.

Sometimes we forget that students do not all come to school with the basic strategies that guide successful learning. Primary grade teachers must identify the needs of struggling students and offer very fundamental guidance if they are to move forward. For example, it was necessary to point out to Chris that the other students were hanging up their jackets, going directly to their seats, and getting their journals out. The type of persuasion that gives an initial boost to get started is sometimes all that is needed to promote active engagement. Fundamental strategies for a specific task, such as beginning by reading through the problem, may need to be pointed out to some students. Helping students to develop an awareness of the need for an action must be accompanied by a personal commitment to the action (e.g., I ought to do this and I can do it). How do we accomplish this? We go back to the same four sources that provide information for efficacy beliefs: mastery experiences, modeling, persuasion, and physiological reactions. The influence of self-efficacy and feelings of agency are clearly intertwined with the process of self-regulation (Paris & Newman, 1990).

Perhaps self-regulation should be viewed more as an attitude than as a set of behaviors. Teachers may best promote development of self-regulated learning by bearing in mind that the overarching goal of self-regulated learning is the transfer of control from others to the self (Paris & Newman, 1990). While very little research has examined SRL in natural classroom settings (Perry, 1998), certain classroom climates are more conducive to the transfer of control to the self. Perry (1998) specifically lists the advantage of child-centered versus teacher-centered classrooms, open task structures that allow children opportunities to select materials that are personally meaningful and at an appropriate level, and process approaches as opposed to skills-oriented models.

The teachers’ own efficacy perceptions also play a fundamental role in the execution of these classroom practices that can help to lead students to
achieve success. Teachers with a high sense of personal efficacy are more likely to believe that they can make a difference and demonstrate the necessary effort and persistence necessary to do so (Woolfolk & Hoy, 1990).

**CONCLUSION**

The first author has taught second grade for more than 20 years and has had experience teaching preschool and students with learning disabilities as well. Chris and Dan are not hypothetical students but very real boys in her class (their names have been changed). Although the causes for their differences in performance cannot be fully established, Gaskill's experiences suggest that the answer lies in the students' beliefs about their own ability to perform. As a matter of fact, by gradually leading Chris to more successful experiences, in just a few months' time he already showed signs of improvement. As with Chris, Gaskill has seen firsthand evidence of self-efficacy and more global self-beliefs at work with many, if not all, students.

We believe that self-efficacy plays a mediating role in learning, even in the primary classroom. Although researchers have looked in depth at many of the topics listed in our guidelines, there is a dearth of research that specifically links these topics to the development of self-efficacy in young children. We encourage teachers to conduct their own action research studies of the effectiveness of the ideas and guidelines in this chapter. Of course these will not be easy tasks. But in our minds, based on our combined experience in working with young children and exploring the extensive mediating effect of self-efficacy in adults, there are few more exciting and fruitful endeavors. It is our hope that more research with children of this age group will lead to a fuller and deeper understanding of the exact nature of these beliefs to provide all children with a positive and exciting start in their quest for life-long learning.

**Teachers' Questions and Answers**

Q: What is the parents' role in encouraging self-efficacy in their children prior to and during their transition to school?

A: Parental influence, a primary force in many aspects of child development, plays a key role in shaping children's earliest self-beliefs. Beginning in infancy, family processes that lead to improved levels of perceived control, competency, and autonomy are key factors. Bronson (2000) identified some specific behaviors that are associated with motivation for control and mastery in young children, conditions supportive of future positive efficacy beliefs. These include relating to children in caring and emotionally supportive ways, being responsive to children's activities and communications, giving consistent but not rigid responses that help them understand appropriate and valued
behaviors, using inductive guidance strategies that point out cause and effect, encouraging responsibility and independence, and teaching problem-solving strategies to increase their independence. Children's adaptation to school in the first few years is influenced by the "fit" between the home and the school. Parenting styles, disciplinary methods, and engagement in educational activities that are close to those encountered in the school setting are more likely to facilitate adaptation to school. Parent expectations of their children's performance are also potent influences.

**Q:** Is there research describing the development of self-efficacy and self-regulation in reading and writing?

**A:** Yes, there is exciting research that has examined what excellent teachers do in the early grades to encourage self-regulated learning during literacy activities. For example, Nancy Perry and her colleagues (Perry, 1998; Perry & VandeKamp, 2000) have studied classroom contexts that support the development of self-regulated learning. Teachers in supportive classrooms engage students in open-ended reading and writing activities; offer students choices about books, topics, or activities; allow students to control the challenge or difficulty of assignments; give students opportunities to evaluate their own work and the work of others; emphasize personal progress rather than social comparisons; and help students interpret errors as opportunities to learn.

**Q:** Is there an age when it is "too late" to intervene to teach self-regulation, and if not, what can teachers do to help older students?

**A:** It is never too late to become more self-regulating—corporate trainers who teach time management and goal-setting skills help adults to better organize their lives and thus become more self-regulating. But the longer students go in school without the skill and will to be self-regulated, the more discouraged they can become. The spiral up from self-regulation to higher self-efficacy to greater self-regulation can become a spiral down to learned helplessness, especially for students who face physical, emotional, or intellectual challenges. The principles are the same at any age, but the applications vary. Goal setting and monitoring progress is especially powerful, as many people know who struggle to change their own unhealthy habits. Moving in small steps, then adding requirements as skills and confidence increase, can be useful. Helping students of any age to evaluate their own work and see the good as well as the "needs improvement" can give the students a sense of power to change. Often portfolios are helpful in recording and reflecting on growth and setting goals for the future. Something as simple as teaching middle school students how to use a daily planner to organize assignments can be a start. Or students might develop power point presentations for each other on how to tackle larger assignments to make them manageable and how to seek appropriate help when needed.
References


