Self-Regulated Learning and Academic Achievement

Theoretical Perspectives

Second Edition

Edited by

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LAWRENCE ERLBAUM ASSOCIATES, PUBLISHERS

2001 Mahwah, New Jersey London

Lawrence Erlbaum Associates, Inc., Publishers
10 Industrial Avenue
Mahwah, NJ 07430

Cover design by Kathryn Houghtaling Lacey

Library of Congress Cataloging-in-Publication Data

Self-regulated learning and academic achievement : theoretical perspectives / edited by
Barry J. Zimmerman, Dale H. Schunk.—2nd ed.
p. cm.
Includes bibliographical references and index.
ISBN 0-8058-3560-1 (alk. paper) — ISBN 0-8058-3561-X (pbk. : alk. paper)
1. Motivation in education. 2. Academic achievement. 3. Self-control.
I. Zimmerman, Barry J. II. Schunk, Dale H.

LB1065 .S46 2001
370.15'4—dc21
00-065403

Books published by Lawrence Erlbaum Associates are printed on
acid-free paper, and their bindings are chosen for strength and durability.

Printed in the United States of America
10 9 8 7 6 5 4 3 2 1

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Chapter 6

Volitional Aspects of Self-Regulated Learning

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Conceptions of self-regulation during learning emphasize the actions a person takes to carry out intentions. The underlying psychological processes that guide these actions are volitional. However, the volitional aspects of self-regulated learning (SRL) remain ill-understood and implicit in many operationalizations. A look forward to the next generation of research suggests the benefits of a better understanding of modern theories of volition.

In an early article Mandinach and I (Corno & Mandinach, 1983) described the role of SRL in acquiring knowledge of school subjects. We adopted concepts from information-processing theory, and argued that self-regulation in school learning reflects students' use of higher level processes to orchestrate and control their concentration, motivation, and affect. We defined SRL as "an effort put forth by students to deepen and manipulate the associative network in content areas, and to monitor and improve that deepening process" (p. 95).

This initial definition made some assumptions. For one thing, it assumed that students seek to understand subject matter content rather than simply committing it to memory. In giving meaning to a subject and monitoring their understanding, students engage important volitional functions. Self-monitoring protects concentration and motivation when intrusions arise in the outer (task) environment, or internally (e.g., as when interest or mood shifts).

Efforts to learn the content material, in part, involve surveying and sampling from available resources. However, resourcefulness here implies more than task-management; it includes self-management, or efficiently handling personal resources as well. This, too, is an aspect of volitional functioning.

Another assumption of our early definition was that students differ in propensities for self-regulated learning—that is, in their knowledge of and tendencies to use SRL in school learning. Such propensities confer advantages, particularly when a learning situation suggests the need for extra effort or support. Even students with above-average cognitive ability need to bring self-regulation to bear on many school tasks. Thus, SRL is not to be equated with cognitive–intellectual ability. Neither does SRL follow predictably from expectation or hope for success. Often, a person calls up personal resources when hope stands on shaky ground (Corno, 1994). SRL cannot then be exclusively cognitive or motivational; it has volitional aspects that weigh in as well.

With the internalization of learning strategies, and self- and task-management, a person comes to use SRL according to situational demand (Corno, 1986). SRL is thus part skill (overlearning provides benefits), and part workstyle (not every student brings SRL propensities to tasks). These refinements in our early definition retain its ties to volition, while also distinguishing SRL from manifestations of personality or temperament over which people have little control (e.g., reflectivity).

Volition has special relevance in education. Many school and classroom learning situations invite or demand volitional control while constraining other behavior. Paying attention, listening, and answering questions are expected in classrooms, yet, when peers work collaboratively, observe models, or change learning stations, potential diversions abound. Observations of classrooms confirm that students confront a range of distractions, even during relatively controlled, teacher-led instruction (Doyle, 1983). Studies of problem solving, when students work individually, reflect similar attentional demands and likewise emphasize the need for coping. A given task, viewed by some students as difficult, may be equally hard to tackle for a student who perceives it as busy work (Stanford Aptitude Seminar, in press).

Beyond situational demands and constraints, students have diverse capabilities, motives, and goals; their levels of commitment vary for goals that teachers establish. As interests and values wax and wane, students' initial intentions and efforts may either escalate or degrade. Some classroom settings and actions by teachers undermine students' best intentions to learn, such as when students feel they have been treated unfairly (McCaslin & Good, 1996). The ability to maintain concentration in the

face of obstacles is a fundamentally volitional aptitude for many tasks of schooling. In our framework, volition is a necessary but insufficient condition for SRL and is given special status as the key to follow-through.

This chapter first presents some general theory on volition, establishing its importance for ongoing research on self-regulation in school learning. Next examples of volitional subprocesses and strategies in academic learning are discussed. Several lines of investigation in educational psychology connect to these volitional aspects of SRL. Finally, I describe some research directed at a better understanding of volition in academic settings and how education might promote it.

MODERN THEORY OF VOLITION

Brief History

The construct of volition fared poorly throughout the history of psychology. Early 20th-century debates among German psychologists questioned its theoretical value. Some theorists equated volition with motivation, or saw the latter as more inclusive. Others found volition either derivative of basic processes, such as emotions or simple cognitions, or merely the manifestation of instrumental conditioning.

In part these problems were tied to ambiguities in colloquial conceptions of volition as willpower or strength of will. Modern volition theory disentangles volitional processes from the vague notion of willfully resisting temptation. Effective use of volitional processes confers advantages. For example, selectively strengthening intentions protects them from interference, thus serving a practical purpose. Similarly, taking immediate action toward goals helps a person avoid the traps of procrastinating. Understanding the processes that underlie action control begins to set volition apart from motivation.

Until the 1980s, the term *volition* appeared rarely in psychological research and related writings on education (Snow, 1986). The current revival is due in large part to efforts by German psychologist Julius Kuhl.[1]

[1]It is fitting that Germany again offers us the construct of volition when her debates did away with it in the first place. Lest we think for a moment, however, that issues of will are somehow linked to German culture, I hasten to point out that early essays on the Puritan ethic spoke of willpower as "proof" of divine worth. Cotton Mather said we should "Prove virtue by denying pleasure." A "no pain, no gain" view of volition is not what modern volitional theory posits, however, as we shall see. In addition, our all-American favorite, John Dewey, wrote an essay on interest and volition that denigrates the "willpower" sense of the term (see Dewey, 1974).

Kuhl made a convincing case for resurrecting an early, unconventional theory developed by Ach (1910). Ach handled the definitional difficulties of volition by distinguishing it clearly from motivation: *Motivation* generates the impulse or intention to act; *volition* controls intentions and impulses so that action occurs. Motivational and volitional processes are therefore related but conceptually distinct and imply different points of intervention. Kuhl (1985) added the idea of reconceptualizing volition within a general information-processing theory, and operationalized the construct as *learned volitional strategies* or *action control.*

Kuhl's Theory and Its Application in Education

Kuhl and Beckmann (1985) collected data on volitional processes in many domains of everyday life from overeating to coping with tragedy, including academic learning. Most of the Kuhl–Beckmann volume reported short-term experiments with adult participants who performed tasks that appear artificial compared to most school tasks, homework assignments, or jobs in work settings (Corno & Kanfer, 1993).

Elsewhere (Corno, 1986; Corno & Randi, 1999) Kuhl's theory was applied to the particular case of academic self-regulation. Some of that writing bears repeating here. The ideas are complex and evolving, and researchers are reluctant to return to discarded theoretical constructs if there is a simpler convincing viewpoint. Kuhl demonstrated that there is both theoretical and functional utility to remaking the construct of volition, particularly in the case of academic learning.

Kuhl (1985) conceptualized volition after Ach (1910) as consisting of "postdecisional, self-regulatory processes that energize the maintenance and enactment of intended actions" (p. 90). Postdecisional, volitional, and action control processes were interchangeable for Kuhl, who considered self-regulatory processes as a broader category. Self-regulatory processes that are motivational precede or impact decisions about to be formed—including, for example, expected consequences, or judgments about the value of a course of action. Volitional processes come into play *after* a decision is made to learn or complete an academic task.

In education, motivational processes *promote* an intention to learn or to carry out a task, mediating the formation of decisions about work. Volitional processes *protect* the intention to learn from competing action tendencies and other potential distractions, mediating the enactment of decisions about work. Although volitional processes are central to self-regulation, other processes, such as task appraisals made in relation to performance, contribute to self-regulation in learning (see Zimmerman, chapter 1, this volume; Stanford Aptitude Seminar, in press).

According to Beckmann and Kuhl (1984):

> Kuhl... postulated that the presence of sufficient motivation and sufficient ability alone are not enough for the actual performance of an intended action unless the action consists of mere routine behavior or is controlled by external forces. When a person intends to perform a certain action, he or she is often subject to various external and/or internal forces which arouse alternative action tendencies. To ensure that the intended action rather than one of the competing action tendencies will be executed, the former has to be selectively strengthened and protected against interference until it is performed. In his theory of action control, Kuhl (1984) presumes that the efficiency of the process of action control is affected by two different states of the organism, i.e., action vs. state orientation (p. 226).

Action- versus state-orientation is defined as a relatively stable disposition that persons manifest in situations that require coping. For example, Kuhl (1981) demonstrated that extended exposure to uncontrollable aversive events, coupled with a tendency to focus on these events rather than on an appropriate plan of action, results in an inability to act. He called this inhibition a *state* orientation. In contrast, when adult subjects are asked to think aloud while solving problems, or to plan a given course of action, they often can be oriented to take immediate *action.*

Dispositional action-orientation tendencies in adults can be measured by questionnaire. The Action-Control Scale (ACS) includes three 20-item subscales for performance, failure, and decision-making situations. One item from the ACS *performance* subscale is, "When I've finished an excellent piece of work," (either) "I like to do something else for a while," or "It makes me want to do some more in the same area." One item from *the failure* scale is, "When my work is labeled 'unsatisfactory,"' (either) "Then I really dig in," or "At first I am stunned." An item from the *decision* scale is, "If I had work at home" (either) "I would often have problems getting started" or "I would usually start immediately." Each subscale asks respondents to provide information about work, leisure, and social activities.

Although Kuhl's theory explained the general case, and much of his early research related action orientation tendencies to behavior, his recent work turned to process explanations in the person–situation interface. Using personality-systems interaction (PSI) theory, Kuhl (1996, 2000) conceptualized different modes of volitional control, allowed for the operation of volition below the level of consciousness, and undertook studies of the conditions under which the different modes operate.

For example, Kuhl made no assumption that all classroom tasks demand deliberate volitional control; features of tasks can supplant the need for a student to protect learning goals. Motivational enhancements such as fantasy elements or games function to make learning

goals so appealing that a student can concentrate on other aspects of self-regulation (Lepper & Malone, 1987). In another sense, a task can seem to "complete itself" when there is sufficient challenge and interest-appeal (Csikszentmihalyi, 1975). Conscious mechanisms for self-control—what Kuhl (2000) called the "inner dictatorship" (p. 115)—then yield to an openness to self-related thoughts and emotions—the "inner democracy" (p. 115). In this case, the volitional program runs as if on autopilot.

Hypothetical situations in which some form of volition is likely to be in demand include the following:

- Students are required to complete assigned tasks and are not free to choose other actions at that time.
- There is sufficient "noise" in the classroom/task environment to distract students from task-related goals that they have elected to undertake.
- Other interests and subjective goals compete with the intent to work or learn, thereby dividing student attention.
- Students develop performance anxiety that obstructs or interferes with the wish to take action. Students then may be "held up" by a rising sense of self-consciousness that suggests the need for volitional control.
- When students believe they possess the skills to perform a task, yet sense the need for deliberate effort to achieve success, then protective moves again are likely to be made. (Bandura, 1986; see Schunk, chapter 4, this volume).

The first two situations emphasize features of external, task environments. The remaining situations describe unions of persons and situations. For example, self-consciousness would be hypothesized to occur when a student perceives a task as difficult and public performance is a requirement. Conditions like these characterize many academic learning and study situations, thereby inviting a mantle of volitional control.

The distinction between motivation and volition should now be clear: Motivational aspects of learning and performance, such as interests and goals, shape intentions and establish commitments. Motivationally relevant cognitions, such as perceptions of efficacy and attributions for past performance, can either fuel task involvement or bring it to a halt. Volition becomes important partly *because* intentions are fragile and people often waver on commitments. The volitional aspects of SRL help a person give priority to commitments, and function to steer involvement along.

Practical Utility

Why volition is useful in education should be evident if one considers for a moment what life in classrooms would be like without student volition. That is why kindergarten teachers, primed to confront pandemonium, work out classroom reward systems for adherence to rules of conduct and strive to develop their students' self-control. As youngsters move along in years, becoming increasingly able to manage schoolwork, their performance continues to benefit from refinements in volitional control. By internalizing school rules and eventually assuming personal responsibility, a student learns to handle the growing complexities of academic study and achievement (Winne, 1995). Again, Kuhl (2000) would say that the form of volition develops from that of inner dictator to more of an inner democracy.

Teachers speak of specific cases, but volitional control issues sometimes dominate entire classrooms, or spill over to the larger school community. The so-called "motivational" problems in America's urban schools are well documented and growing (Brophy, 1998). However, the tendency for teachers and scholars to classify volitional issues together with motivational problems is mainly out of convention and does little to help in dealing with either. Factors that influence students' intentions to learn and concentrate may be less amenable to educational intervention than postdecisional, volitional factors.

Utility for Theory and Research

Why volition is useful from the standpoint of scientific psychology is perhaps less obvious but no less important. As Snow (1986) argued, reintroducing the volitional construct deepens psychological theory, permitting a better understanding of how cognition, affection, and conation work together (Hilgard, 1980; see also Snow & Farr, 1987, p. 33).

Another ancient construct only recently brought back into modern theory, conation is defined as the state of unrest that characterizes both motivation and volitional functions. It thus integrates components of motivation and volition, forcing study of their interaction. Like volition, conation has yet to be embraced by some researchers; however, there is no denying the theoretical symmetry and parsimony of three basic psychological functions. What is more, when the full range of conative processes is studied in conjunction with cognition, and when affect is seen as central and not peripheral to performance, human behavior and performance can be better explained (Corno, in press; Snow, Corno, & Jackson, 1996). For example, striving toward clearly established goals may result in success even when cognitive processing and affective

engagement are inadequate. However, many goals will not be reached without striving, and striving is meaningless without goals.

Theory in specialty areas such as social psychology is also evolving. The best example may be Bandura's theory of social learning and behavior change, now complicated and enriched by a focus on social–cognitive processes (Bandura, 1993; Zimmerman, chapter 1, this volume). The evolution of a process-theoretic viewpoint in social psychology permits a healthy alignment with developmentalists who have long held that the internalization of behavior and thinking modeled by others (i.e., social construction) is a keystone in cognitive–social development (McCaslin and Hickey, chapter 7, this volume; Vygotsky, 1962; Wertsch, 1979). When one believes, with Bandura (1974), that humans are "partial architects of their own destinies" (p. 867), then there is no need to side philosophically with determinism or free will. Instrumental contingencies become internalized over the course of development to regulate action; but humans also apply appropriate instrumentalities purposefully as situations demand. Having volition can then be seen as the tendency to mobilize and maintain self-regulation in given situations, not simply as the manifestation of learned contingencies.

The reintroduction of volition to theory and research in educational psychology is also important given the rising stature of motivation as a recent interest of educational researchers (compare Ames & Ames, 1984 with Pintrich & Schunk, 1996). Theoretical contributions from American psychologists, including Weiner, Bandura, and Deci, have fueled solid lines of continuing research on attributions, self-efficacy, and the educational environments that affect self-regulation directly. Just as Kuhl (1985) reconceptualized Ach's theory of volition in information processing terms, so these psychologists reach down to the processes involved in traditional motivation theories. Performance attributions, expectations, self-observations, and self-evaluations are no longer defined as cognitions with motivational overtones, but actually recognized as processes combining both functions. Because none of these cognitive–motivation theories *focuses on* postdecisional processes that protect intentions to learn, however, the particular problem of volition goes unaddressed.

One reason to rectify this situation is the potential for teaching children rudiments of volitional control, when it seems impossible to change their prior reinforcement histories with school. Prior performances in a variety of more or less academic situations shape both attributions and beliefs about efficacy for school-related work; better volitional control mediates these relations. Equally difficult to accomplish, some feel, are the changes to instruction and organization of educational settings recommended by Deci and Ryan (1985), changes that allow students and

TABLE 6.1
Categories of Volitional Control and Specific Volitional Control Strategies

I. Covert processes of self-control
A. Control of cognition
1. Attention control*
2. Encoding control*
3. Information-processing control*
B. Emotion control*
C. Motivation control
1. Incentive escalation*
2. Attribution
3. Instruction
*II. Overt processes of self-control: Environmental control**
A. Control of the task situation
1. Task control
2. Setting control
B. Control of others in the task setting
1. Peer control
2. Teacher control

Note. *Volitional controls identified by Kuhl (1985); in this article Kuhl equated motivation control with incentive escalation, and did not distinguish the subprocesses of environmental control.

teachers more equivalent control. This, of course, is an empirical matter, which is the final reason to revive volition in educational research—to spawn studies that might resolve this and other issues.

Volitional Subprocesses of SRL

Elsewhere (Corno, 1986; Corno & Randi, 1999) examples were given of six ways students can use volitional control strategically. Table 6.1 presents an expanded list of Kuhl's six volitional strategies, organized by categories of volitional subprocesses.

Asterisks mark Kuhl's (1985) six strategies in the table. Several of these involve efforts to control covert, internal processes. Controlling attention to information and encoding, for example, is a form of metacognition. Likewise, by consciously controlling emotion and thinking ahead to positive or negative outcomes, an individual can manage the affective and motivational aspects of learning and performance. How to engage in successful self-control has been a focus of cognitive–behavioral interventions in the field of clinical psychology for some time (see Meichenbaum,

1977). Another way of viewing volitional controls, then, is at a meta-level; they are aspects of *self- and task-management* that facilitate learning indirectly (see Dansereau, 1985; Thomas, Strage, & Curley, 1988).

Volitional strategies are trainable. Kuhl's research (see Kuhl, in press) even manipulates strategy use experimentally and assesses the conditions under which volition will be called into play. An important issue with respect to training volitional strategies is that these are subtle aspects of mental functioning that vary across learners and may be disrupted (at least temporarily) during early learning. Intervention with young learners is therefore promising. Although there is a certain parallel in cognitive strategy instruction (Pressley et al., 1995; Weinstein & Mayer, 1986), strategic volition may be less amenable than most cognitive strategies to short-term training.

Volition continues to develop through adolescence based on a growing awareness of one's own functioning, including cognition, motivation, and affection. This developmental process is heavily influenced by socialization practices in the home and elsewhere (Kuhl & Kraska, 1989; Kuhn & Ho, 1980). It therefore seems likely that successful volitional strategy training will involve the kind of naturalistic guidance, or participant modeling instruction, that has come to characterize more effective forms of cognitive and metacognitive strategy training (Collins, Brown, & Newman, 1989; Corno & Randi, 1999; McKeachie, Pintrich, & Lin, 1985; Paris, Byrnes, & Paris, chapter 8, this volume; Pressley et al., 1995).

The second major category shown in Table 6.1 reflects efforts to control the self by controlling one's environment. Human factors research emphasizes the value of modifying or adapting the person–task interface for more effective or efficient performance. Some people instinctively modify poorly designed tasks, by streamlining steps, for example, or reorganizing priorities. Others cleverly manipulate other people in the task situation to help them get work done. Combining these strategies is one way to reduce excessive task demands — streamline the task, but also seek assistance, and find a way to hush-up distracting peers. The general category of environmental control includes all of these things.

Each of the entries in Table 6.1 can be illustrated further as they might be observed in classroom tasks. To take first the area of covert self-control, such actions as diverting one's eyes from the class clown or tuning out excess noise would be examples of *attention control. Encoding control* involves selectively thinking about those aspects of a task that facilitate completion. Thus students can opt to rehearse only the material on which they will be tested, or plan out steps for completing a task mentally. *Information-processing control* is, in Kuhl's (1985) terms, the

"definition of stop rules for information processing" (p. 106). A student who processes information efficiently (or makes decisions efficiently) quickly assesses steps needed to perform a task and then gets down to business, thus "optimizing the motivational power of the intent" to learn (p. 106).

One may also, as Waters and Andreassen (1983) suggested, avoid adopting a style that overtaxes the processing system, or elect a brief timeout from a tedious task as a way of regrouping and refreshment. This example suggests a different way of looking at some students' so-called "off-task" behavior. Mobilizing volitional processes when situations demand maximizes the efficiency of information processing, supports the intention to learn, and increases the liklihood of follow-through on tasks. One could think of strategic volition as a way to insure the smooth running of an easily crashed central processor.

To control negative affect during learning, students may inhibit or alter detrimental emotional states such as worry. *Emotion control* may involve using positive inner speech to help maintain task engagement: "I can't worry about this; I can't get irrational." It might also include admonishments that produce sufficient guilt to carry a person through, or converting an unpleasant emotion to one that is more agreeable. A student could cope with the anxiety associated with waiting for test results by thinking of interesting and relaxing things, for example.

For Kuhl, *motivation control* reflects prioritization of intentions; in school, learning intentions, for example, must be given priority over other, competing intentions. It may be preferable to socialize with friends, but doing homework has to come first after school. Sensing a lapse of motivation for completing a given task, a student can think ahead to the consequences of failing and the pleasure that will come instead with success. In some publications, Kuhl called such thinking *incentive escalation* (see Kuhl, 1984). Zimmerman and Pons (1986) used the similar idea of *self-consequences* to represent both imagined and actually arranged outcomes. Both of these terms are more descriptive than the term *motivation control*, which is a more general category that subsumes several other subprocesses (just as we saw with control of cognition).

Research has identified some of these motivation-control subprocesses. In addition to incentive escalation (or control of expected outcomes and values), a student can control motivation with an accurate analysis of causality ("I know this material, and how to approach it;" or, "I failed, but I can succeed next time if I study better"). Self-instructing also works wonders: "I missed most of these; reread closely and take notes." Later on I shall discuss variations on each of these subprocesses.

The overt processes of self-control reflect strategic control of the environment. These are more easily assessed than the covert strategies, and

probably develop naturally in students' home and school environments. For example, doing homework provides an opportunity for many children to learn to manage time and create a proper workspace (Xu & Corno, 1998). In Kuhl's taxonomy of volitional controls, environmental control is the most amenable to direct intervention (Kuhl, 1984). Again, environmental control includes both changes to be made in task situations (i.e., changing the task itself or the task setting, such as where and when a task is completed), and changes in the behavior of other people who support the task (i.e., typically, teachers and peers).

Individuals can also arrange environmental contingencies to help themselves complete difficult tasks. For example, a student can set proximal subgoals for a task, rather than more distal commitments that would be harder to carry out. Similarly, there is value to self-rewards for hard work and imposed penance for dawdling. These changes help students gain control of the *task outcome. Controls in the task setting* are different and involve, for example, asking permission to move away from noisy peers, or using a calculator, word processor, or other equipment in the interest of efficiency. Students may also manipulate their own intentions in more subtle ways, for example, by surrounding themselves with hard-working peers, or asking a good friend to provide social support and avoid references to past failures. Such controls complement direct efforts to obtain extra assistance or favors from teachers, and fall into the subclass *control of others in the task setting.* They enhance concentration and affect as well as control behavior.

VOLITION-RELATED RESEARCH ON SRL

Three types of studies reflect the range of research being conducted to capture SRL in academic settings. Various *descriptive* studies identify and document self-regulation moves by students during regular academic tasks. Some of these show evidence of strategic volition. Second, *correlational* research relates self-regulation (and volitional controls) to student aptitude profiles, task factors, and performance outcomes such as academic achievement. The correlational studies distinguish SRL from general cognitive ability and document its independent contributions to school performance outcomes for different types of tasks. Third, there is a growing body of *experimental* research on tasks designed to elicit or teach students various aspects of self-regulation; here, researchers compare the performance of experimental groups to that of controls who receive different tasks. Classroom experiments vary task and instructional conditions to promote self-regulation directly and assess resultant academic performance.

Some Leads from Descriptive Studies

In many descriptive studies of learning and performance, evidence of volition is implicit; detective work is needed to find it. For example, Dyson (1987) conducted an in-depth analysis of the "spontaneous talk" of eight elementary students during language arts periods taught by the same teacher. As the children interacted with their peers to complete writing assignments, they were audiotaped. Dyson then combined these protocol data with participant observation records to conceptualize student collaborative effort. Her data show students spontaneously using volitional control to complete school tasks effectively.

In language arts, there was evidence that students (a) asserted themselves to manage peers ("I was sitting here"), (b) were self-congratulatory ("I knew that"), and (c) anticipated audience reactions to their own written work. Noting that something might be "hard" for readers to understand was a student move Dyson interpreted as an incentive to rewrite. The study documents the importance of active mental and environment control to effective written work. And yet, volition was not implicated per se.

In a different vein, a descriptive study by Johnston (1985) documented the *lack* of effective self-regulation in the academic efforts of reading-disabled adults. Johnston used a case analysis method, and held interactive assessment sessions with three males, in which he elicited think-aloud reports and oral reading performance. The think-aloud protocols included spontaneous introspections and retrospections. In addition to the conceptual problems his respondents displayed, Johnston noted extensive use of dysfunctional styles of coping. These included, for example, bluffing, avoiding the teacher, and listening for oral instructions.

Such moves allowed participants to function in society even though they were largely illiterate. The coping style also effectively prevented efforts these men may have made to overcome their illiteracy, and so proved self-handicapping in the long run. Johnston also noted the frequency with which such coping was accompanied by negative affective responses (debilitating anxiety and stress).

One implication is that overcoming the problem of adult reading difficulty may require self-management interventions in addition to improvements in reading skills. For example, students can learn how to cope with failure effectively, through balanced performance attributions that suggest a second try. Persistence is more likely when past failures can be attributed, for example, to multiple causes, only some of which can be personally controlled (e.g., "Perhaps I didn't try hard enough, but I was also given poor instruction.)" In recent investigations

of the workstyles of learning disabled students, Butler (1996) specifically targeted volitional deficiencies as potentially critical areas for intervention.

Rohrkemper (1986) conducted still another type of descriptive study. She interviewed urban elementary school students with different levels of academic ability as they completed math problems of varying difficulty. Her interest was in examining "inner speech" accompanying problem solving, under easy and more difficult conditions. Eighty-four students, balanced by mathematics ability and gender, participated. A structured questionnaire/interview asked students to identify things they might "say to themselves" while solving particular mathematics problems. Categories of statements included motivational remarks as well as self-instruction (e.g., "I take my time and try to figure the problem out;" I make a plan.)" The strategic self-instruction reflected some of the aspects of motivation control previously defined.

These students used inner speech to regulate task performance irrespective of individual differences in ability and gender. There were differences in the amount and type of inner speech, depending on task difficulty: Less inner speech occurred on difficult tasks, and more self-related (as opposed to task-related) speech occurred during easy tasks. Again, the study shows that self-regulatory statements specifically referring to volitional controls occur spontaneously among students at this age level, even among those with different ability profiles. McCaslin and Hickey, (chapter 7, this volume) now refer to volitional controls in their continuing work on inner speech in self-regulated learning.

A final descriptive account derives from data by Leinhardt and Putnam (1987), who produced videotapes of fifth-grade students as they learned about astronomy under different instructional treatments. The videotape data again show spontaneous use of self-regulation and a clear instance of encoding control: One student said, in an interview during which he viewed a videotape of his class lesson in mathematics, "Well, I was thinking about... what she was saying because it was something new so I had to keep my eyes on it 'cause this is on our MAP test... it's kind of important" (p. 575). Again, however, the term *volition* was not in the language these researchers used to interpret data.

The Bulk of the Work: Correlational Studies

Correlational work dominates SRL research, as evidenced from national studies (see Jan Simons & Beukhof, 1987) to international handbooks (Boekaerts, Pintrich, & Zeidner, 2000). However, some research takes up questions of volition directly. For example, DeWitte and Lens (in press) investigated academic procrastination in college students using

self-reports. They also measured study intentions, time spent studying, student's perspectives on studying, and optimism as a personality trait. Correlational analyses showed that optimistic procrastinators postpone their intentions to study with little guilt whereas pessimistic procrastinators feel badly. An additional finding was that persistence of procrastinators and their performance on an open-ended response question benefitted from a focus on details of the task, rather than a broad perspective on studying. In this research, both personality and workstyle mediated performance.

Such direct investigation of volitional questions contrasts with the frequently-cited correlational research of Zimmerman and his colleagues who used a structured interview procedure to measure SRL. Zimmerman and Pons (1986) asked eighty students from higher and lower tracks of a suburban high school to "indicate the methods they used to participate in class, to study, and to complete their assignment" (p. 617). The interview included specific examples from classroom learning, homework, and studying for tests. Student responses were coded into various categories of self-regulated and nonself-regulated learning. At least 5 of the 14 categories of SRL identified reflected processes of volitional control, although the authors did not use this term in their description. There were, for example, instances of students rearranging the task environment to make learning easier, seeking information and social assistance, selecting out more from less important material to study, and imagining or actually arranging positive and negative outcomes for working.

Results showed that frequency of SRL strategy use significantly distinguished higher from lower achievers. Overall, regression analyses showed self-reported use of SRL to account for 36% to 41% of the variance in both verbal and quantitative standardized test scores; this was over and above percentages accounted for by parent level of education and gender. Zimmerman and Pons produced a more refined measure of SRL, as well as good evidence (despite their lack of reference) for the practical and theoretical value of SRL's volitional aspects (see Zimmerman, chapter 1, this volume for an update).

Another type of correlational study is illustrated by Blumenfeld and Meece (1988), who categorized middle-school science lessons by difficulty level, type of social organization, and procedural complexity using field observations. These different lesson types were then distinguished by the extent to which they produced or lessened involvement and cognitive engagement, as reported by 191 students in questionnaires and interviews. The student self-report data again included questions about SRL strategy use during the lessons observed. Only one of these questions, regarding help seeking, was volitional.

Although reported strategy use in this study related significantly to students' perceptions of lesson involvement, strategy use was unrelated to performance outcomes such as test scores and grades. Among several possible explanations the authors provided for these results were a lack of correspondence between what is demanded in lessons and what is tested, and a lack of student ability to *employ* strategies on tests. This latter hypothesis raises the possibility that volitional strategies are most predictive of performance outcomes, and yet again these were underrepresented on the researchers' strategy questionnaire.

Measures that tap volitional components directly need to be placed in a correlational network with other indicators of SRL strategy use. Bembenutty and Karabenick (1998) obtained self-reports of SRL from college students and related these to measures of "academic delay of gratification." They conceived academic delay as a likely outcome of successful SRL strategy use. Their delay scale asked students to report on met deadlines, library use, peer interactions, and studying, for example. Students with higher delay scores showed more constructive motivation and better strategy use, but the strongest correlations appeared between delay scores and students' reports of how they used their time and studied. Again there is the suggestion that elements of volition play an important role in academic work.

Perhaps the most direct measure of volition related to schooling is McCann's (1999) Academic Volitional Strategies Inventory. Included are questions beginning with the stems "I tell myself..." and "I think about..." and ending with "you can do it!" or "get to it and concentrate..." Each item reflects strategies represented in Table 1. McCann's dissertation, using the Inventory with a sample of 246 college students and a causal correlational analysis, found course grades to be enhanced through cognitive engagement, which in turn was supported by volitional control.

The Rare Experiments

Three experimental studies illustrate what is possible with experimental research in education, although well-designed experiments remain rare.

Shapiro (1988) conducted a semester-long dissertation study with a sample of 156 remedial mathematics students in a large urban college. The treatment was a specially designed textbook providing worked examples of algebra problems these students encountered in their remedial coursework. In early lessons of the text, problems were accompanied by strategic problem-solving statements, as well as various volitional prompts.

For example, a problem included suggestion of an efficient problem-solving algorithm as well as the idea that students should pay careful attention to the information given. Some problems also suggested ways to handle frustration and points at which the student might want to try another solution. Such prompts were "faded" in later lessons, but the text left space for students to record their own efforts and tactics. Homework assignments on parts of the text, criterion-referenced, and standardized posttests served as dependent measures.

The textbook was randomly assigned to classes in an experimental group; a traditional text, covering identical content, was used by classes in a comparable control group taught by the same instructor. Nested ANOVAs controlling for teacher differences showed results favoring the treated group to be statistically significant for all measures (effect sizes averaged .40). This study showed that students can be taught by text to use the cognitive and volitional strategies that mark SRL in basic algebra, and that strategy use results in higher achievement.

Shapiro dealt with all the obstacles confronting experimental field research and still produced supportive results; moreover, her little-known study demonstrated that strategy use can be learned through *textbook* instruction alone and does not necessarily require teacher intervention.

Another type of experiment, which should be seen more frequently, examined aptitude-instructional treatment interactions in the acquisition of strategic planning knowledge and self-regulatory skills in an intellectual computer game. Mandinach (1987) gave 48 urban junior high school students after-class instruction in a "hunt-the-monster" computer problem-solving game. Students either (a) explored the game's parameters with minimal intervention by the instructor (they used a "discovery learning" approach); or (b) they received modeling in optimal moves along with instructor-guided practice and gradually faded prompts.

Students representing different levels of cognitive–intellectual ability were assigned randomly to treatments and attended several individual sessions with the experimenter. A variety of process and outcome measures reflecting strategic planning and follow-through ranged from "hard data" such as computer-generated response latencies, error patterns, and game scores, to transfer tasks and qualitative field notes, student drawings, and spontaneous verbalizations. A combination of latency data and student self-statements served as indicators of self-regulation and its volitional aspects.

Results showed that higher ability students significantly outperformed lower ability students on gaming measures and transfer tasks. Higher ability students also gave more evidence of self-regulation, on average, than lows. All students, regardless of ability, performed best in the

participant-modeling treatment; however, this main effect was not statistically significant. An interaction effect showed that lower ability students, in particular, benefitted from modeling; their performance was markedly lower in discovery learning.

Mandinach concluded from these data that ability differences influenced profitability from the game-playing instruction. Although able players demonstrated more evidence of self-regulation on average, some higher ability players never displayed evidence of self-regulated learning. Mandinach did not compare frequencies of volitional strategies with those of other SRL strategies, however.

In a follow-up to this experiment, Mandinach (Mandinach & Linn, 1986; 1987) conducted qualitative case studies of the higher ability students she considered "superstars" by virtue of their performance on this task. She found that extensive use of self-regulation and strategic planning knowledge defined the work efforts of these individuals. Thus, it again appears that strategic self-regulation can be learned by a particular form of instruction targeting specific academic tasks.

This study adds the caveat that *able students* will use SRL strategies readily. Because a "read only" version of instruction was not provided, we have no way of knowing whether a guided-modeling computer text akin to Shapiro's math textbook would produce results similar to Mandinach's experimenter-directed instruction.

A final type of experimentation is illustrated by a line of recognized research by Scardamalia and Bereiter on the teaching of elementary writing and composition (Scardamalia & Bereiter,1983; 1985; 1993). This work, like Shapiro's and Mandinach's, exemplifies the current style of experimentation in education, where instructional treatments are based on analyses of the underlying cognitive and self-regulatory skills necessary to perform a particular task as reflected in protocols of "experts" at work. Also like Shapiro and Mandinach, Scardamalia and Bereiter provided instruction that modeled expert self-regulation during writing, and guided performance, with gradually reduced support.

These authors focused on instruction in the planning, writing, and revising phases of written composition. Teachers addressed each phase separately, initially with teacher–learner interaction, and later requested that students "fly solo." Students received examples of statements they could say to themselves to aid with idea generation and improved writing techniques; many of these statements were self-regulatory or volitional in nature (Scardamalia & Bereiter, 1985). Think-aloud protocols, obtained following instruction while students produced written work, gave evidence of strategy use. The quality of written products for students working under experimental and comparable control conditions was then compared.

Several related experiments are reported in the examples just cited, all of which demonstrate significant effects favoring elementary students instructed in the manner described. Positive effects appear on the quality of strategies reflected in protocols, on time spent in planning, and on the quality of text produced.

There is a notable method of successful instruction common to all the experiments described, suggesting the conditions under which self-regulatory skills can be learned. Collins, Brown, and Newman (1989) singled out work by Palinscar and Brown and Scardamalia and Bereiter (along with Schoenfeld, 1985) as examples of this form of instruction. Elsewhere, I (Corno, 1987) listed some of the different names for this type of instruction, including "participant modeling" (after Bandura, 1977), and "cognitive apprenticeship" (Collins, Brown, & Newman, 1989):

> There are two key reasons for [Scardamalia & Bereiter's] success. First... their methods help students build a new conception of the writing process. Students initially consider writing to be a linear process of knowledge telling. By explicitly modeling and scaffolding expert processes, they are providing students with a new model of writing that involves planning and revising. Most children found this view of writing entirely new.... Moreover, because students rarely if ever see writers at work, they tend to hold naive beliefs about the nature of expert writing... Live modeling helps convey... struggles, false starts, discouragement, and the like. Modeling also demonstrates for students that in evolving and decomposing a complex set of goals for their writing, expert writers often treat their own thoughts as objects of reflection and inquiry... (p. 13)

The result is budding self-regulation. It remains to be shown whether or not volitional and other aspects of SRL can be learned in the absence of modeling, and the extent to which live models are necessary with younger students.

I have illustrated the range and types of research that contribute to a better understanding of SRL and how it intersects with volitional control. A key question for this early generation of SRL research was, "What aspects of self-regulation are most relevant for academic work, and how can these best be taught to students for whom they might be of benefit?" Descriptive research on processes used by more effective learners to complete academic tasks helped to answer the first part of this question. The second part is addressed by exploring the ways students use and acquire self-regulatory propensities naturally, through socialization and modeling. Later studies that inculcate strategies by training or naturalistic instruction will develop attunements for self-regulated learning.

EXAMINING OTHER EVIDENCE OF VOLITION IN CLASSROOMS

The previous section described work that touches on volitional aspects of self-regulation more or less indirectly. Our research at Teachers College during the past decade centered squarely on volitional strategies in classroom tasks. We began with a microanalysis of descriptive data in a few small sample studies and moved to experimental designs. Our method in the descriptive studies was to control enough task variables so volition would likely be important to success, and to search for varied evidence of volitional strategy use by students as they complete tasks. We assumed, following Kuhl (in press), that different task conditions (i.e., products, operations, and resources; see Doyle, 1983) will influence student use of volition.

One dissertation study 6 weeks long involved an analysis of peer distractions as students worked cooperatively in small groups. Panagiotopolous (1986) observed 21 fifth graders in a self-contained public school classroom in the Bronx. Students were ethnically mixed and performing slightly above average on standardized achievement tests.

Several of Kuhl's situations that induce volition were designed into the tasks for this study: The tasks were required by the teacher, who expected completion during the time allotted with all of the potential distractions that collaborative work provides. In addition, the work was familiar to students, and pitched at a moderately low difficulty level (tasks involved alphabetization, dictionary use, arithmetic, etc.). The cooperative task used Slavin's (1983) Student Teams-Achievement Divisions, in which teams cooperate in the completion of predesigned, objectives-based materials. As recommended by Slavin, teams were balanced on indicators of academic performance, gender, and ethnicity. Teams completed the same materials in 30-minute sessions that were audiotaped and later transcribed. The verbal protocol data reflect task-management as well as task-completion processes.

Our interest was in the extent to which students enlisted volitional control to complete assigned tasks as a group, under otherwise regular classroom conditions. The intent was to see which, if any, of the strategies these fifth graders had internalized through their own experiences, that is, which would appear without prompting. We hoped then to use that information as scaffolds for teaching other strategies that might require direct development or training.

A test battery, administered prior to the study, served as a classification device. We measured two aspects of students' general intellectual ability using a test of analytical reasoning (Raven, 1958), and the verbal and mathematics subscales of the California Achievement Test

(CTB/McGraw-Hill, 1977). In addition, to obtain an index of motivation, we measured perceived competence using Harter's (1979) *Perceived Competence Scale for Children*, cognitive and general-competence subscales.

Two major aspects of these data are of interest. Some of the data are described in detail to illustrate another form of evidence for volition that can be obtained from classroom research.

First, coded transcripts from all six cooperative sessions were used to classify data into categories reflecting the ways that students worked in groups. Independent coders reached 100% agreement when classifying each segment of the transcript as "main task" and "alternative task." Agreement reached 92% in classifying "main task" remarks as either task-"management" or "completion"' activities. *Task-management* activities involved volitional controls such as tracking and gathering information for completing the task, moving oneself and other students along in their respective roles, checking progress, handling distractions, motivating oneself and others, and the like. *Task-completion* activities involved moves to actually *do* the task, such as subtracting or adding out loud during math tasks and repeating the alphabet aloud during alphabetization. A third main task category was defined as *instruction* to show the amount of times that one student instructed another, which, incidentally, also served volitional functions.

We computed mean percentages of verbal activity for all cooperative sessions in language and math. Students were involved in alternative tasks 20% to 25% of the time, and instructing one another less than 5% of the time. By far the bulk of their main task work in both subject areas was management activity. Students spent two thirds of their total time, on average, managing the task at hand. Moves to complete the task that were verbalized (students were specifically asked to say their answers out loud) amounted to 5% to 9% of time spent, with the larger percentage being in math.

A second aspect of the data of interest are segments of verbal protocols that reflect volitional control. We culled the protocols to locate segments illustrating the use of volitional strategies identified by Kuhl (1985) and listed in Table 6.1. We cross-coded the transcripts until we reached agreement on categorizations. The intent was to show students using volitional control in a group setting to move assigned tasks along.

I begin with an illustration of the types of evidence we identified, and then discuss some of the important roles students assume when working cooperatively. Our data provide a different way of viewing the roles of *task master* and *instructor* in cooperative-learning activities. Because we have data on each student's cognitive ability and perceived competence, we may also see which types of students were more inclined to use volitional control in this setting. This may result in hypotheses for

future, more comprehensive examinations of individual differences in volitional control.

Types of Evidence

Sections from a representative transcript in mathematics show how students used several volitional tactics to move the task along. The groups were given answer sheets for the task, and told to check and help one another. The question, then, is what procedures for task management could be observed apart from checking and merely helping?

Anne:	Come on, let's work. You work.
Paul:	Okay. Eight times five is...
Honey:	Five times eight...
Paul:	Is forty.
Anne:	Don't tell him! He has to work it himself.
Honey:	Okay.
Anne:	Five times eight is...
Paul:	...is forty.
Paul:	It's forty! It's right. It's right!
Anne:	Oh, yeah!
Paul:	Five times one is five plus four is nine.
Sal:	Gotta round it to the nearest ten.
Paul:	That too.
Sal:	Zero times five. What's zero times five?
Anne:	How did you get nine hundred for that?
Sal:	Ten. Zero.
Paul:	Why'd you ask me if you knew? You don't know how to do nine hundred?
Anne:	I don't understand. Wait a minute. Ms. Panagiotopoulos! I can't understand this. I did all of this.
Sal:	Where's Honey? Honey, you got the answers? Let me see...
Ms.P:	Who's got the answers in your group?
Sal:	Her.
Anne:	Me.
Honey:	Me.
Anne:	You want to sit next to me?
Paul:	Naw, you give me your paper.

Sal:	Paul, you know that. You know it, Paul.
Paul:	I know it, but... I forgot we add the two.
Sal:	My God, you're on number five. Well, I'm only on number six.
Honey:	You better stop, Sal.
Anne:	Eight times six? Oh yeah. Forty-eight. Why are you asking me? Why don't you ask yourself? Count on your fingers. Oh, I hate this so much.
Paul:	I love it so much. Oh, this is very nice.
Anne:	I like it and I hate it.

This passage shows a prevalence of environmental control. Peer control is used here by Paul, Sal, and Anne to keep themselves on task. These students successfully protect their own time by warding others off ("Why'd you ask me...?"). Getting hold of the answer sheet is one way to check one's own work. Paul uses knowledge of successful results to self-motivate ("It's right!"). Anne also uses information-processing control when she urges everyone (herself included) to work. Anne's comments reflect self-attributions, attempted teacher control, and emotion control.

When students work together in groups, they use a number of different techniques to keep one another going. Some of these techniques provide more encouragement than others. The use of informed feedback, self-attribution, and specific suggestions for how to attack the task are all constructive ways of motivating oneself and others (Brophy, 1998). Some students used these techniques spontaneously in their groups.

Anne, who used self-attribution, emotion control, and instruction as motivational tools, displayed average ability and high perceived competence on the pretest. Paul scored highly on the ability measures, but low in perceived competence. Paul's behavior pattern was to self-motivate, bring emotion to the task, and try to control his peers. Sal, who evidenced peer-control as well, scored average on ability and low on perceived competence.

Little can be made of these data on individual differences except to look across other segments of the transcript for similar patterns and other sensible relationships. Discernable patterns might be used to form hypotheses for future investigations. A more immediate implication is that strategies used by a few students in group work are simultaneously observed by the others, creating the possibility for vicarious learning through observation of a model (Bandura, 1986). One could also envision a computer programmed to help students make different types of motivational statements to themselves when they falter, hesitate, or express negative emotions.

Two Leadership Roles in Cooperative Learning: Active Steps to Insure One's Own Learning

A second excerpt from a mathematics transcript paints a different picture. In this session, Honey assumes a leadership role we referred to as "task master:" She tries hard to move the group along:

Honey:	(To the group) He does all of it. Do all of it. Do the first, no, do the first row and then you check it. Do the next row and then you check it. No, don't do that. Do the first row, okay?
Michelle:	Right?
Honey:	Five is four: two, five; three, one. Right. Now do that. I said do the whole row. You checked it?
Phillip:	Yeah.
Honey:	You sure? Everything's right?
Phillip:	Every single thing.
Honey:	Check it. 'Kay? This is wrong.
Phillip:	Yeah, that's wrong.
Michelle:	Wait a minute. Let me just do the last one.
Honey:	Hurry, hurry, hurry, hurry.
Phillip:	Right? You check it? No, you didn't check it.
Honey:	Now, say the numbers. Start from the beginning. Say the numbers and he'll see if it's right or wrong. 'Kay? No, no, no, no! Like this, watch. 'Kay? Number four, two, three, one. Right. Let's don't say nothing cause we might get in trouble with this. (*Honey just had Michelle answer two questions for her.*)

One interpretation of Honey's behavior is that it mimics the way a person in authority behaves. Persons in authority cajole, badger, direct, entrap ("You sure? Everything's right?"), and model ("Like this, watch.") to get something done. Parents, teachers, and employers act this way often, and Honey has learned to do it well. She recapitulates it for us when placed in an authoritative role. Honey scored high in ability and average in perceived competence.

Children internalize the motivation controls displayed by parents and other authority figures and call them up themselves when managing their own tasks (Xu & Corno, 1998). Indeed, some researchers see social interactions as the developmental experiences necessary for the

flowering of volitional control (Wentzel, 1991). Most important here, however, is the fact that *by managing others, Honey also manages herself.* Her active efforts at task management protect her own intention to concentrate; it is hard to get distracted when you are the task master.

Two interesting questions for future research are, then: How do students learn or develop volition from early social interactions with authority figures and older siblings; and How might parents and teachers emphasize the more positive, caring forms of motivation control with children (i.e., incentive escalation, attribution, instruction), rather than cajoling and badgering? Noddings (1984) argued that teachers can model the caring aspects of motivation at the same time that they teach subject matter. This suggestion deserves systematic investigation.

Transcripts from our study also present examples of students we identified as exceptional "teachers." Because it is part of the ethic of cooperative learning to help others, some students naturally assume a teaching role (Webb, 1983, 1992). As with the role of task master, assuming a teaching role during cooperative learning is another active way for a student to protect concentration. Insuring that everyone understands the task and carries out actions to complete it also insures one's own understanding and contribution. A close examination of the remarks made by one of these identifiably "good teachers" provides a second example of how taking an active role during cooperative learning also insures one's own learning.

Shpresa, a girl of average ability and average perceived competence, was told by others that she was a good teacher. The following are examples of Shpresa's teaching in math and language:

Shpresa:	Wait, wait, you did it wrong.
Henry:	Who me?
Shpresa:	The directions say you must, you must write your estimate and multiply, then you must write the answer.
Henry:	I got it right. No doubt about it.
Jackie:	So, shut up.
Shpresa:	No, you round, you round to the nearest hundred.
Henry:	You check.
Michelle:	Eight times five?
Shpresa:	You're supposed to know that, Michelle. The fives are the easiest. It's forty, right? You have to write the zero first right over here. Okay, now. One times five.

Michelle: One times five.
Henry: Shpresa, let me have the answer sheet. The teacher made a mistake.
Shpresa: I know she made a mistake on, uh, four.
Shpresa: You see? Would you be quiet? I wrote it easier for her. Eight times three so I wrote three eights. Eight plus eight is sixteen...
Ms. P: Maybe she can't see your handwriting because you're sitting on that side.
Michelle: Eight and seven you can't do. Okay.
Shpresa: How'd you get that? How'd you, how'd you get twenty-five?
Ms. P: Good teacher! Wow!
Salvatore: Four. Six. Shpresa's a good teacher. Did you hear that?
Shpresa: Okay, Michelle. Okay, listen. You have to all, all's you have to do is add. You estimate to the nearest ten thousand. If it says, listen um, if it says, if it says like six thousand by itself, then you can't estimate to the nearest ten, you just have to leave six thousand.

And in language arts:

Shpresa: Come here. I'll, I'll help, do you understand?
Dina: No.
Shpresa: Okay, come here. Come sit here.
Shpresa: Come here. See? You know, the *shwa* sound.
Salvatore: (*Gasps*) You got the answer sheet?
Dina: Shpresa, is this *nit* or *night*?
Shpresa: I can't tell you.
Salvatore: *Night.* She don't know her long I's and everything. She don't...
Shpresa: You have to look over here. You have to look and you'll see, you'll see the things that uh, uh. Okay.
Salvatore: I'm doing that.
Shpresa: It says over, you could see it over here, the *shwa* sound. The *shwa*'s like this way. Where's the *shwa*? Where is it?

Salvatore:	You're a good teacher. (Shpresa laughs.)
Shpresa:	Okay. Joseph, you did pretty good on it. Do you know what to do, Adriano?
Adriano:	Huh?
Shpresa:	You almost finished?
Adriano:	No.
Shpresa:	You don't have to rush, you can take your time.

At the beginning of the math passage, Shpresa uses knowledge of results and direct instruction to control Henry's actions ("Wait, you did it wrong. The directions say..."). In so doing, she repeats the task's directions to herself. Later, in response to Michelle's question, Shpresa is at first admonishing with her attributions ("You're supposed to know that..."), but quickly offers some concrete suggestions that simplify the task (task control) and encourage Michelle to go on to the next item. When Henry asks for the answer sheet because he suspects a teacher error, Shpresa shows him that she has *already* identified the error herself.

This move sets Shpresa up as an authority over and above the instructional role she adopts. Taking control by simplifying the task for another student is again evident: Shpresa says, "I wrote it easier for her," and describes why this is so. This models the strategy of simplifying the task, thus providing other students with an example of one means to gain control. The teacher also suggests the idea of changing the setting (which again gains control) when she encourages Shpresa to move closer to the student she is helping. The excerpt from language sessions shows Shpresa modeling, self-checking, simplifying the task, using incentives ("Come here, I'll help..."), repeating directions, and offering positive reinforcement.

Again, these important instructional actions provide models that other students can use, and insure Shpresa's own involvement at the same time. If more students could learn to become "task masters" and "teachers" in cooperative learning, there might be fewer lapses in task-oriented behavior. This is not to suggest that every student must be a leader, but rather that there is room for more than one leader, and that the leadership roles in cooperative learning serve the volitional functions of protecting one's own task-related behavior as well as that of others.

Individual Differences in Volition

We can only speculate about individual differences based on data from this study. In examining the students who assumed leadership roles during cooperative learning, a pattern emerged. Six of the 21 students in

the sample tended to assume either the task master or instructor role consistently. Honey and Anne, for example, were task masters in all sessions observed; Shpresa and Louis were always instructing. The tendency to assume these roles did not appear to be related to ability measures in our data—among the six students, all ability levels were observed. However, little can be made of this finding because previous research on cooperative learning *has* found higher ability students to display more helping behavior and instruction than lower ability students (Webb, 1992).

Perceived self-competence was high, on average, among the six students observed in our study. Assuming task-master or instructor roles in cooperative learning may thus relate to perceived ability to perform in school. This is an hypothesis derived directly from Kuhl's (2000) theory, which posits perceived ability as one condition for volitional control. The precise nature of this relationship sorely needs delineation. The relationship between efficacy and volitional control may be curvilinear, for example, and this makes theoretical sense (Stanford Aptitude Seminar, in press). There is likely to be an optimal amount of efficacy or personal confidence for given tasks or situations, with either an excess or a deficiency being potentially detrimental. We do not see indications here that "task-master" profiles differed from those of "instructors" in our data, although that, too, would be an interesting question for future research.

Our individual difference data are typical of those obtained in classroom research studies, namely, standardized measures of cognitive ability and self-concept. It would be interesting to add a version of Kuhl's action-orientation scale to this database. Kuhl (1982) found positive correlations between his dispositional measure and measures of test anxiety and achievement motivation on the order of .20. Because the action-orientation scale is specifically designed to tap into a personality factor related to behavioral indicators of volition, its validity could exceed that of other measures in predicting volitional strategy use in classroom tasks. A revised action-orientation scale that includes only items pertaining to classroom or academic tasks, and is valid and reliable for use by a younger population, would make a contribution. Based on knowledge of the students in our small sample who assumed leadership roles, we expect that action orientation would predict these tendencies more than the kinds of individual difference measures we obtained.

For example, classroom experiments could investigate relationships between student ACS scores and their performance under different academic tasks at different grade levels. Tasks could be designed or selected to create decision conflicts, as some experiments have done. Students of different orientation levels could be asked to think aloud, following

Kuhl (1981), while researchers observe their relative use of volitional controls under different conditions (e.g., when tasks vary in difficulty, interest, or support). A valid action-control scale would also be a useful way to augment standardized tests with noncognitive data.

Data from this study provide one lens on volition. Individual volition may be less important in completing cooperative tasks than when students work alone; cooperation allows students to protect each other's efforts, as just described. It is tempting to assume that the need for volition arises most when there is no one available but oneself to get a job done (when the task is not controlled by external forces). Nonetheless, we saw the kinds of distractions that peer work provides; students in this study were not equally oriented toward completing the assigned task in cooperative groups. There was a good deal of bantering coded as "alternative-task" behavior that would have been coded as "off task" in research focused on other processes.

A major limitation of verbal-protocol data is that the most expressive students are the ones displaying strategy use. Zimmerman and Pons (1986) handled this problem by attaching a 4-point scale to their interview protocol that asked each student to rate *frequency* of strategy use. This measure was a better predictor of student performance than counts of strategies mentioned in the interview. A computer could also elicit a similar rating.

To overcome verbal bias in cooperative audio transcripts, stimulated recall interviews might be used. For example, the audiotape could be played back to students who vary in verbal fluency. The interview would ask for their thoughts during the session. This method of data collection is labor-intensive. However, another dissertation by Xu (1994; see Xu & Corno, 1998) made profitable use of stimulated recall interviews following videotapes of third graders doing homework with their parents. Parents and children had different interpretations of the stresses and strains produced by homework, and the videotapes provided good opportunities for parents to explain the ways they tried to help. In some cases, there was clear evidence that children began to internalize parental modeling of volitional controls.

Further study is needed of how volitional control develops naturally in real-world instructional environments and imposed situations such as doing homework (Corno, 1994; Turner et al., 1998). For example, Bullock & Lutkenhaus (1988) examined volitional development in toddlers at play and work in the laboratory. Results showed predictable shifts in volition-related behavior, even during play, as children approached 3 years of age. The children's growth in volitional control related positively to measures of self-involvement, general self-regulation, and cognitive change.

THE ONGOING RESEARCH AGENDA

There are several agenda items for the next generation of research on volition in academic learning. A mapping is needed of the range of classroom tasks and situations that afford opportunities for volitional control by students (Mischel & Shoda, 1998). Students may or may not use volitional processes when working individually, in the absence of joint control. Some features of tasks will demand volition more than others; for example, tasks that hold little intrinsic interest for students would be difficult to complete. Boredom may operate, or not completing them may be reinforcing somehow (Wolters, 1998). Research needs to demonstrate the utility of volitional control in different classroom tasks.

There is also a need to follow studies like Zimmerman and Pons (1986) to learn how best to measure classroom strategy use, including performance-based indicators that are nonverbal (see Pressley et al., 1995). Studies like Mandinach's provide some nice leads; Mandinach required students to teach back what they had learned about the computer game (in this case, to a researcher). All students thus displayed performance evidence, not just those inclined to be verbal.

A recurrent topic has been the important educational outcomes that can be predicted reliably by use of volitional strategies. Task engagement and timely completion of tasks are important consequences of volitional management described in many other chapters in this volume. More than 20 years ago, classroom research substantiated the powerful link between student engagement and academic achievement (Berliner, 1979). What other affective and cognitive payoffs might there be to having volitional control in classrooms (Rohrkemper & Corno, 1988; Stanford Aptitude Seminar, in press)? What may be the downside risks (McCaslin & Good, 1996)?

Sorely needed are more and better experimental manipulations of volition in the educational arena. Can we induce action orientation easily, as Kuhl (1981) did with adults, in school children? Will asking them to think aloud while solving programs in a natural classroom setting be effective? What of the suggestion that computers could be programmed to remind users to self-reward, or press on to the next item when too much time has elapsed; or to rehearse, self-check, and the like (Scardamalia & Bereiter, 1993)? What effects might exposure to such a virtual parent have on student learning? Will this kind of volitional modeling be internalized for later use? Can students who lack volition learn it under these conditions? Or is social interaction with a human model who demonstrates volitional strategy use under difficult conditions important for some learners?

An another dissertation from our project by Trawick (1990) involved underprepared college students in a remedial counseling program at a local community college. She instructed students in positive self-speech and environmental controls that aid in managing academic work. She role-played things to do when facing a final exam, when choosing between a dinner date and homework, when concentration buckles during class, etc.. These role-play scenes were vehicles for delivering instruction in volitional strategy use, as well as measurement procedures for assessing learned strategies. However, not all of her students benefitted equally.

In further work, Randi and I (Corno & Randi, 1999; Randi & Corno, 1999) designed classroom tasks for elementary and secondary students that demand volition. Our "curriculum-embedded approach" to teaching SRL centers on the close match between the inherent messages of the quest genre, or literary "journey tale," and modern conceptions of volition. In future studies, teachers will attempt to develop an intellectual understanding of academic volition in their students, and the research design will vary high- and low-demand tasks systematically.

CONCLUSION

This chapter characterized the role of volition in conceptions of SRL. Volition is a propensity on which people differ. Many school situations demand volition, and volitional control is an important product of education (Corno, in press; Stanford Aptitude Seminar, in press). Volitional aspects are implicit in most assessments and existing studies of SRL, but evidence of volition is sufficiently important, both in theory and empirically, to be given more explicit attention than it has in years past.

We enrich scientific theory with clear concepts and integration. The promise of different and better assessment procedures and more interpretable relationships among interacting constructs likewise embellishes research. Ultimately, it may be possible to account for and redress some important issues in educational performance by understanding the common underpinnings of effective interventions such as cognitive-behavioral therapies and cognitive-emotional strategy training in schools. It will be similarly important to achieve a better integration of social-cognitive theories of motivation and theories of volition in SRL.

In the area of volitional control, practical implications abound. Conscious use of volitional strategies can assist individuals to protect their best-laid plans—whether the plan is for a researcher to produce written work while teaching graduate courses and raising children, for a student to follow a teacher's agenda when other interests loom large, or for a

teacher to modify distracting mannerisms. When I talk to an audience about theory and research on volition, I find that people want to improve their own volitional capabilities; they are eager to refine volitional skills and become more resourceful. We look forward to future research that shows them how.

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