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Self-Regulated Learning Processes and Children's Writing

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Self-Regulated Learning Processes and Children's Writing

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Writing is a complex and difficult task. It takes many years to develop competence in the writing process, and even more time for expertise to develop. The complexities of both the writing process and the development of writing skills and abilities create significant challenges for research. Research on writing, furthermore, has a relatively limited history; Nystrand (2006) dated the launch of empirical research on writing as the early 1970s. Progress has been made, yet a great deal remains to be done. Writing research has received far less funding and attention than research in reading or math, further challenging progress in this area (Harris, Graham, Brindle, & Sandmel, 2009).

Concentrated research has been occurring, however, on the role of self-regulated learning processes (also referred to as self-regulation strategies or techniques, these terms are used interchangeably in this chapter) in students' writing. We focus on this area in this chapter. First, we discuss the emergence of self-regulated learning perspectives in writing and the importance of self-regulation in the writing process, and briefly note theoretical perspectives and models of writing that have provided a basis for writing research. We then further narrow our focus to two major areas of research on self-regulation with school-age students: (a) the use of discrete self-regulation processes for writing (including goal setting, self-monitoring and self-evaluation, self-instruction, and self-reinforcement) and (b) the incorporation of these self-regulation processes into larger, multi-component writing interventions. Finally, we conclude with a discussion of issues and future research needs in this important area of educational research.

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THE ROLE OF SELF-REGULATION IN WRITING

Early models of writing cast it as a linear and somewhat simplistic activity (Graham, 2006a; Zimmerman & Reisemberg, 1997). Today, however, researchers recognize that the writer must deal with the rules and mechanics of writing while maintaining a focus on factors such as organization, form and features, purposes and goals, audience perspectives and needs, and evaluation of communicative intent and efficacy (Bereiter & Scardamalia, 1987; Harris & Graham, 1992, 1996). Research on writing and writing development has profited from researchers and theorists working from multiple theoretical bases including cognitive, cognitive-behavioral, constructivist, social-cognitive, sociocultural, motivation, and expertise theories (Harris et al., 2009; Harris & Graham, 2009; Harris, Santangelo, & Graham, 2008). Influential models of the writing process have been posited by Hayes and Flower (1980, later revised by Hayes, 1996), Bereiter and Scardamalia (1987), and Zimmerman and Reisemberg (1997). Each theory and each model has contributed unique perspectives to our understanding of the writing process, the developing writer, and effective writing instruction (see Harris et al., 2009, for further discussion of each).

Contemporary models of writing recognize it as a cognitive, linguistic, affective, behavioral, and physical process set within a larger socio-cultural context (e.g., Harris & Graham, in press; McCutcheon, 2006; Prior, 2006). Collectively, the most influential theoretical frameworks emphasize that writing is a recursive, strategic, and multi-dimensional process centric to (a) planning what to say and how to say it, (b) translating ideas into written text, and (c) revising what has been written. Theories and models of writing either explicitly or implicitly acknowledge the critical role of self-regulatory processes in writing.

A variety of self-regulation strategies competent writers use to manage the complexities of composing have been identified (cf. Harris, Santangelo, & Graham, 2010). These include goal setting and planning (e.g., establishing rhetorical and content goals and tactics to achieve them), seeking information (e.g., gathering information pertinent to the writing topic), record keeping (e.g., making notes), organizing (e.g., organizing notes or text), transforming (e.g., visualizing a character to facilitate written description), self-monitoring (e.g., checking to see if writing goals are met), reviewing records (e.g., reviewing notes or the text produced so far), self-evaluating (e.g., assessing the quality of text or proposed plans), revising (e.g., modifying text or plans for writing), self-instructions (e.g., statements about what needs to be done, dealing with difficulty), rehearsing (e.g., trying out a scene before writing it), environmental structuring, (e.g., finding a quite place to write), time planning (e.g., estimating and budgeting time for writing), self-reinforcing (e.g., going to a movie as a reward for completing a writing goal), seeking social assistance (e.g., asking another person to edit the paper), and self-selecting models (e.g., emulating the writing style or tactics of a more accomplished author).

Further, research substantiates the important role of self-regulation in writing in at least four ways: (a) skilled writers are more self-regulated than less skilled writers; (b) developing writers become increasingly self-regulated with age and schooling; (c) the level of self-regulation writers bring to the composing task is related to their writing performance; and (d) instruction that enhances developing and struggling writers' self-regulation combined with meaningful practice opportunities improves their writing performance (Graham, 2006b; Graham & Harris, 2000).

Thus, developing self-regulation of strategic behavior is important in developing competence and promoting performance in writing. As Zimmerman and Reisemberg (1997) explained:

> Most students recognize that in order to become a proficient writer, they must acquire knowledge of vocabulary and grammar, however, they are far less aware of their need for high levels of

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> self-regulation. This need stems from the fact that writing activities are usually self-planned, self-initiated, and self-sustained. Writers typically perform alone, over long periods with frequent stretches of meager results, and repeatedly revise output to fulfill personal standards of quality. These demanding personal requirements have led writers throughout history to develop varied techniques of "self-discipline" to enhance their effectiveness. (pp. 73–74)

Zimmerman and Reisemberg proposed a model of writing including three fundamental forms of self-regulation: environmental, behavioral, and covert or personal. They argued that these triadic forms of self-regulation interact reciprocally via a cyclic feedback loop that allows writers to self-monitor and self-react to feedback about the effectiveness of specific self-regulatory techniques or processes. They proposed that writers exert deliberate control over the act of writing via 10 self-regulation processes.

Zimmerman and Reisemberg (1997) further argued that the self-regulation of writing involves a complex system of interdependent processes. Further, they placed particular emphasis on the construct of self-efficacy, as they proposed that these complex, interdependent processes are closely linked to an underlying sense of self-efficacy. A writer's sense of efficacy may be enhanced or diminished depending upon the perceived success of the self-regulatory strategies they put into play for controlling their actions, the writing environment, and their internal thoughts. Self-efficacy, in turn, influences intrinsic motivation for writing, the use of self-regulatory processes during writing, and eventual literary attainment.

Understanding the role of self-regulation in the development of writing abilities, the difficulties students encounter with self-regulation of the writing process, and effective instructional practices for developing competence in self-regulated writing is clearly essential to helping students develop as writers. We turn now to the findings of research focused on specific self-regulation techniques and their role in the writing process.

FINDINGS ON SPECIFIC SELF-REGULATION PROCESSES AND WRITING

Research has led to a number of important findings regarding self-regulation techniques used during composing. These include goal setting, self-instruction, self-reinforcement, and self-monitoring (also called self-assessment or self-recording). Because of the importance of revising in the writing process, we also present findings regarding self-evaluation (also called self-management) and revision. These self-regulation strategies have been well researched, classroom tested, and have proven effective and important (Mace, Belfiore, & Hutchinson, 2001; Reid, Trout, & Schwartz, 2005). Although we discuss these self-regulation processes separately, in practice they are commonly and effectively combined by writers and in writing instruction (Harris, 1982; Harris & Graham, 1996).

Goal Setting

Goal setting is as an important component in the writing process and in writing instruction; skilled writing, in fact, is characterized as a goal-directed activity (Hayes & Flower, 1986). Broadly defined, goal setting involves establishing specific, appropriately challenging, and proximal objectives; goal setting has been shown to be effective across a wide range of human endeavors (Harris & Graham, 1996). Effective goals help writers understand the task at hand, consider genre conventions, structure effort, provide information on progress, and help maintain motivation and performance (Harris & Graham, 1996; Schunk, 2001). Effective goals are specific (or elaborated

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and tangible), proximal, and appropriately challenging (Bandura, 1988). Specificity refers to how well a goal is defined. Goals which are vague (do your best) are not as effective as those that are specific (be sure to use a catchy opening and good word choice) and elaborated (specific plans for what to include in a paper, what to say, and how to say it). Proximity refers to temporal aspects of goals. Goals that can be completed in the near term (complete 3 pages of my first draft this week) are generally more effective than distal goals (write my paper by the end of the month). Difficulty refers to the level of challenge a goal poses. Effective goals are appropriate for the individual student—neither too difficult nor too easy.

Research on goal setting has established benefits for both students who are typically developing writers and those who struggle with writing. Goal-setting interventions with school age students have resulted in improvements in the amount and quality of writing, time spent planning and writing, the use of genre elements and conventions, and both substantive and mechanical revisions (cf. Ferretti, Lewis, & Andrews-Weckerly, 2009; Graham, MacArthur, & Schwartz, 1995; Hopman & Glynn, 1989; Page-Voth & Graham, 1999). Research also indicates, however, that the effects of goal setting are neither uniform nor always easy to predict (Ferretti et al., 2009).

For example, novice and struggling writers need help developing and using specific and realistic goals (Bereiter and Scardamalia, 1987). Goals need to be appropriate for individual students (Harris, Graham, Mason, & Friedlander, 2008; Harris & Graham, 1996). Further, for goal setting to be effective, goals must be valued. A goal that has little or no importance to the student is unlikely to improve performance or enhance motivation and effort. Additionally, attributions (the perceived cause of an outcome) must be considered (Schunk, 2001). Progress toward a goal should be seen as primarily the result of effort rather than luck or outside agency (e.g., the teacher helped me). While teachers can effectively use goal setting as an important part of writing instruction, goal setting must be done with care and the effectiveness of the goals monitored, with goals revised as needed. Further research is clearly needed in this area.

Self-Instructions

Competent writers typically hold a covert (and sometime overt) running dialogue with themselves as they write, reflecting on where they are, what needs to be done, why some idea or approach does or does not work, how to phrase an idea or effect a reader, what they like, and so on (Harris & Graham, 1996). Self-instructions help regulate performance in part by orienting, organizing, and structuring writing behavior (Graham, Harris, & Reid, 1992; Harris & Graham, 1996). Self-instructions can also help students deal with difficulties with individual characteristics such as impulsiveness and with emotional reactions such as frustration and anxiety. In essence, helping students develop and use appropriate personal self-instructions allows them to "talk themselves through" a writing task (Harris & Graham, 1996).

Meichenbaum (1977) identified six basic forms of self-instructions which have been applied to writing: (a) problem definition—defining the nature and demands of a task; (b) focusing of attention and planning—attending to task and generating plans; (c) strategy statements—engaging and using a strategy; (d) self-evaluation and error correcting—self-assessment of process and product, and error correction; (e) coping and self-control—dealing with difficulties and emotional reactions; and (f) self-reinforcement—rewarding oneself for successful performance (Harris & Graham, 1996). Typically, teachers and students work together to develop appropriate, meaningful self-instructions for writing and practice their use; teachers also model the use of self-instructions. Self-instructions are worded by the student and selected types, rather than all six, are used (Harris & Graham, 1996). Research has typically focused on the inclusion

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of self-instructions in multi-component writing interventions, rather than their use alone, with some research indicating that they are an effective element for some students and may enhance generalization and maintenance of writing skills and abilities (cf. Sawyer, Graham, & Harris, 1992; Harris, Graham, et al., 2008).

Self-Reinforcement

Self-reinforcement occurs when a student selects a reinforcer and self-awards it when a predetermined criterion is reached or exceeded (Harris & Graham, 1996; Graham et al., 1992). Learning to use self-reinforcement is akin to the natural developmental process where a child learns that meeting expectations usually results in positive reinforcement while failing to meet expectations results in no response or a negative consequence (Zimmerman, 1998). Although some students may independently learn to self-reinforce, others will need explicit assistance to use self-reinforcement during the writing process (Harris & Graham, 1996). Implementing self-reinforcement involves (a) determining standards for rewards, (b) selecting a reinforcer, (c) evaluation of performance, and (d) self-awarding reinforcement when criterion is reached.

Some research has indicated that self-reinforcement can be effectively used alone and may be as effective as teacher reinforcement, but little research on self-reinforcement alone has been conducted in writing. Self-reinforcement is often combined with other self-regulation techniques. Although tangible and activity reinforcers can be used, research indicates that the use of reinforcing self-statements in combination with other writing and self-regulation strategies is effective for most students (Graham & Harris, 2003; Harris, Graham, et al., 2008).

Self-Monitoring

Self-monitoring is one of the earliest studied and most thoroughly researched self-regulation techniques (Harris, 1982; Reid, 1996). Self-monitoring occurs when a student self-assesses whether or not a target behavior has occurred and then self-records the results (Nelson & Hayes, 1981). Two forms of self-monitoring have been investigated in writing: self-monitoring of attention (SMA) and self-monitoring of performance (SMP). SMA involves teaching students to self-assess and self-record some aspect of attention related to the writing task while they are writing (e.g., Was I working on my writing?). Students are prompted to self-assess and self-record at random intervals usually ranging from 10 seconds to 90 seconds. Results of the assessment are recorded on a tally sheet. In one study, SMA was found to be effective in improving the length and quality of fifth and sixth graders' stories, and also increased students' on-task behavior (Harris, Graham, Reid, McElroy, & Hamby, 1994).

With SMP, students self-assess some aspect of their performance on a writing task (e.g., number of genre elements used, use of effective word choice) then self-record the results. Self-assessment and self-recording occur after the writing task has been completed. Self-recording commonly is done using a graph. For example, students might self-assess by counting the number of essay parts used and self-record by coloring in a graph of a rocket broken into the target number of elements (cf. Harris, Graham, et al., 2008). Self-monitoring of the number of desired genre elements, and/or length (i.e., number of words used), have most frequently been examined in research (e.g., Tracy, Reid, & Graham, 2009). Self-monitoring typically does not involve the use of external reinforcement; however, in some cases (e.g., students with attentional and emotional challenges) self-monitoring has been combined with external reinforcers to enhance effects (Reid et al., 2005). Procedures for teaching students SMA and SMP are straightforward and well established (see Graham et al., 1992; Reid & Lienemann, 2006).

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Self-Evaluation

Self-evaluation is closely related to self-monitoring but differs from self-monitoring in the use of external comparisons and reinforcement. Self-evaluation in writing has been conceptualized in two ways. First, writing behavior has been rated at set time intervals and compared to the evaluation of an external observer (e.g., teacher, paraprofessional; Shapiro & Cole, 1994). Students are reinforced based on how closely they match the external rating. For example, students might rate their behavior on a scale of 1 (I didn't get started on time and didn't finish my essay) to 5 (I got started on time and finished my essay). After students have attained consistent agreement with the external rater, external matching is faded and students self-award based on their self-evaluation. Self-evaluation of behavior with students with ADHD has been found to reduce disruptive behavior and increase time on-task (e.g., Shapiro, DuPaul, & Bradley-Klug, 1998).

Second, self-evaluation has been conceptualized as a problem-solving process of detecting mismatches between the intended text and the actual text (Bereiter & Scardamalia, 1987). Self-evaluation as a problem-solving process has been used frequently and effectively for both revision of content and writing mechanics (Hillocks, 1986), and is discussed next.

SELF-EVALUATION AND REVISION

Cognitive models of writing give a prominent place to revision, generally defined to include both changes made to text already written and changes to plans and ideas generated prior to writing. Early models of revising described it as a problem-solving process of detecting mismatches between the intended text and the actual text (Bereiter & Scardamalia, 1987). More recent models include discovery of new ideas as well as detection of problems (Hayes, 2004). In both cases, revision is dependent on self-evaluation processes. Writers read their text (or consider their plans) and self-evaluate their work, identifying problems or opportunities and attempting to improve the text.

Expert writers evaluate their texts throughout the writing process and revise to improve meaning, organization, language, and conventions, whereas, novice writers typically revise primarily for mechanical problems. A number of explanations have been offered to explain this difference. Experts have a more sophisticated conception of revising as focused on meaning, while novices think of it as fixing discrete errors. Revision depends on ability to evaluate texts that novices might lack. Novices might not be able to identify problems or have difficulties fixing the text despite noticing problems; or they might not have the self-regulation ability to manage the overall process. Bereiter and Scardamalia (1987) conducted an experiment to separate the self-regulation process from the knowledge and skill components. They proposed a model of revising that begins with writers *Comparing* the text with intentions; if a mismatch is detected, then they *Diagnose* the problem; finally, they *Operate* to fix the text. Bereiter and Scardamalia hypothesized that students might be able to manage the individual Compare, Diagnose, Operate skills but not be able to self-regulate to manage the overall process. In the experiment, students used cards that prompted them to Compare, Diagnose, and Operate as they revised a text. For example, a Compare prompt might read, "This doesn't sound right." The study found that the prompting routine helped students to identify and diagnose problems in ways that agreed with expert evaluations. Graham (1997) extended the results to students with learning disabilities (LD), finding that the prompting resulted in higher quality revisions. De La Paz, Swanson, and Graham (1998) extended the results further by including prompts for evaluation of overall meaning and organization as well as sentence-level evaluations. They found increases in the quality of revised

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texts as well as the number of substantive revisions. In these studies, simple prompts to engage in self-evaluation affected students' revising processes. Transfer or generalization of these effects was not investigated in these studies, however.

More direct evidence of the importance of self-evaluation comes from intervention studies in which students learned processes for evaluating their own compositions and making revisions. In his meta-analysis of writing instruction research, Hillocks (1986) found that teaching evaluation criteria to students and showing them how to use those criteria to evaluate their own papers was effective in improving writing quality. For example, Sager (1973) taught urban sixth graders to evaluate papers on four criteria: vocabulary, elaboration, organization, and structure. Students received extensive practice rating papers individually and in small groups, and their ratings were compared to teacher ratings. They also suggested revisions to improve the papers. After eight weeks of instruction, students had made significantly greater gains on all four aspects of writing than a control group. Unfortunately, as Hayes (2004) has pointed out, most of the studies on self-evaluation in the Hillocks' meta-analysis were flawed. More recently, Ross, Rolheiser, and Hogaboam-Gray (1999) conducted a careful quasi-experimental study in which upper elementary students participated in defining evaluation criteria, learned to apply the criteria to their papers, received teacher feedback on their self-evaluations, and planned to use their self-evaluations to improve their writing. Students in the experimental group made greater gains in quality of narrative writing, especially lower achieving students.

Self-evaluation is an important component of multi-component strategy instruction approaches to writing development. Graham and MacArthur (1988) used the Self-Regulated Strategy Development (SRSD) model for strategies instruction to teach a strategy for revising persuasive essays to students with LD. The revising strategy included evaluation criteria specific to persuasive text (e.g., check whether the thesis statement is clear) and a routine for managing the overall revision process. Additional self-regulation strategies, such as goal setting and self-statements, were also included. Instruction resulted in increased substantive revision and improved quality. MacArthur and his colleagues (MacArthur, Schwartz, & Graham, 1991; Stoddard & MacArthur, 1993) tested a peer revision strategy that included instruction in criteria for self-evaluation and a peer-supported routine for discussing and evaluating their writing. Peer response was thought to enhance learning to evaluate writing by providing a real reader, offering reciprocal experience as reader and editor, and by encouraging students to discuss their evaluations and explain their thinking. In both studies, students who received instruction made more substantive revisions and improved the quality of their papers. On a metacognitive interview (MacArthur et al., 1991), students in the treatment group demonstrated greater awareness of evaluation criteria than control students.

Research on the Cognitive Strategies Instruction in Writing (CSIW) model (Englert, Raphael, Anderson, Anthony, & Stevens, 1991) included instruction in expository text structures and strategies for planning and revising. The revising strategy focused on asking self-evaluation questions specific to a particular text structure, as well as general evaluation questions. The Computers and Writing Project (CWIP; MacArthur, Graham, Schwartz, & Schafer, 1995) likewise included both planning and revising strategies. The project used the peer revising strategy described previously. Others have also integrated instruction in planning and evaluation/revision (for a review, see Graham, 2006b).

The intervention studies discussed so far have included explicit instruction in evaluation criteria with practice to develop independence in self-evaluation. Two other approaches have been used to develop self-evaluation and revision ability: (a) experience as a reader and (b) experience observing readers. For example, Holliway and McCutchen (2004) asked students to write descriptions of abstract tangram figures (figures made by arranging a set of triangles and

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squares), and then asked them to read descriptions written by other students and choose which tangram figure was being described. Students who experienced struggling to understand others' texts made more and better revisions of their own papers than students who received feedback on their descriptions. Self-evaluation was not specifically measured, but students clearly learned something about problems with their texts.

A related approach involves having writers observe readers attempting to comprehend the writer's text. In one study (Rijlaarsdam, Couzijn, Janssen, Braaksma, & Kieft, 2006), students wrote descriptions of simple physics experiments and then watched videotapes of readers attempting to carry out the experiment before revising their descriptions. Observing readers led to higher quality revisions. In addition, students wrote letters of advice to other students about how to write a clear description of a science experiment. Students who had observed readers wrote better letters including criteria for effective writing.

Self-evaluation of one's writing is necessary for effective revision. Explicit instruction in evaluation criteria and their application to revising texts is an effective way to improve students' writing. Experiences as readers and opportunities to observe other readers as they attempt to make sense of texts can also contribute to the development of self-evaluation skill. The two approaches can be combined in instruction that teaches strategies for evaluation and revision and encourages students to apply those criteria in discussions with peers and teachers.

SELF-REGULATION AS PART OF MULTI-COMPONENT INTERVENTIONS

As noted previously, the self-regulation procedures we have discussed are often combined in larger, multi-component interventions. Here, we focus on multi-component cognitive strategies instruction approaches in writing. Cognitive strategies instruction models share certain core characteristics including explicit instruction in and highly scaffolded development of writing and self-regulation strategies and gradual release, or fading, of support as students develop effective ownership of strategies (cf. Harris & Pressley, 1991; Harris, Santangelo, et al., 2008).

Three multi-component models of strategies instruction in writing have been developed. The Strategy Instructional Model (SIM) has been effective for developing sentence and paragraph writing abilities (e.g., Deshler & Schumaker, 2006). Englert et al. (1991) developed a model referred to as Cognitive Strategy Instruction for Writing (CSIW), which was effective in developing a combination of composing and revision skills in one genre. Writing researchers have suggested that self-regulation components are fundamental to an effective writing intervention program (Mason & Graham, 2008). In SIM, for example, goal setting and self-evaluation are noted as key elements of effective sentence writing (Schmidt, Deshler, Schumaker, & Alley, 1988). CSIW instruction fosters self-regulation by supporting the development of student self-instruction and self-questioning while planning, composing, and revising explanation and compare/contrast essays (Englert et al., 1991).

The third multi-component approach to strategies instruction is the SRSD model noted earlier. SRSD, as initially developed by Harris (Harris, 1982; Graham & Harris, 2009), includes explicit development of goal setting, self-monitoring and self-evaluation, self-instructions, and self-reinforcement procedures. Since 1985, more than 40 studies using the SRSD model of instruction have been reported across multiple genres of writing, involving students with and without disabilities from the elementary grades through high school (Graham & Harris, 2003; Harris et al., 2009). In meta-analyses of true- and quasi-experimental design studies, SRSD has had the strongest impact of any strategies instruction approach in writing (Graham & Perin, 2007; Rogers & Graham, 2008). Thus, in the space we have here, we turn to a discussion of this model.

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SRSD

SRSD has consistently resulted in significant and meaningful gains in five main aspects of students' performance: (a) genre elements included in writing, (b) quality of writing, (c) knowledge of writing, (d) approach to writing, and (e) self-efficacy (Harris et al., 2009). Improvements have been documented in students' use of planning and revising strategies, and these improvements have been consistently maintained for the majority of students over time, although some students need booster sessions for long-term maintenance. Many students have shown generalization across settings, teachers, and writing media. Here, we present a brief overview of SRSD instruction. Detailed descriptions of SRSD instruction are available, however. Detailed lesson plans and support materials for instruction are provided in Harris, Graham, Mason, and Friedlander (2008); see also Harris and Graham (1996). All of the stages of instruction can be seen in both elementary and middle school classrooms in the video, *Teaching Students with Learning Disabilities: Using Learning Strategies* (ASCD, 2002). Multiple online interactive tutorials on SRSD are available at http://iris.peabody.vanderbilt.edu/. Finally, a website devoted to strategies instruction can be found at http://www.unl.edu/csi/.

There are five critical characteristics of SRSD instruction (Harris, Graham, et al., 2008; Harris, Santangelo, et al., 2008). One, knowledge about writing, writing strategies (genre specific and general) and self-regulation strategies are explicitly taught and developed. Two, students are viewed as active collaborators who work with the teacher and each other during instruction. Three, instruction is individualized so that the processes, skills, and knowledge targeted for instruction are tailored to students' needs and capabilities. Goals are adjusted to current performance for each student, with more capable writers addressing more advanced goals. Instruction is further individualized through the use of individually tailored feedback and support. Four, instruction is criterion based rather than time based. Five, SRSD is an on-going process in which new strategies are introduced and previously taught strategies are upgraded over time. SRSD in writing is not a complete curriculum or writing program, but rather one effective element of writing instruction (Harris, Graham, et al., 2008).

Six stages of instruction are used to introduce and develop writing and self-regulation strategies in the SRSD approach. Throughout the stages, teachers and students collaborate on the acquisition, implementation, evaluation, and modification of these strategies. These stages are briefly presented here; they can be reordered, combined, revisited, modified or deleted based on individual students' needs.

Finally, procedures for promoting maintenance and generalization/transfer are integrated throughout the stages of instruction in the SRSD model (Harris & Graham, 1996; Harris et al., 2009), including: identifying opportunities to use the writing and/or self-regulation strategies in other classes or settings, discussing attempts to use the strategies at other times, reminding students to use the strategies at appropriate times, analyzing how these processes might need to be modified with other tasks and in new settings, and evaluating the success of these processes during and after instruction. Other teachers and parents can also support use of the strategies at appropriate times in other settings. Booster sessions after initial instruction, where the strategies are reviewed and discussed and supported again if necessary, are important for most students in terms of maintaining and generalizing the strategies.

Develop and activate background knowledge. Background knowledge and preskills students need to successfully understand, learn, and apply writing and self-regulation strategies are developed in this stage; for some students, this continues through stages 2 and 3. Reading, analyzing, and discussing model texts and poor texts is typical in this stage. This is also an

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appropriate time to help students identify whether their writing performance is hindered by negative self-statements (I'm no good at this), and show them how to utilize positive self-statements (I can do this if I use the strategy and take my time).

Discuss it. In the discuss it stage, teachers and students continue to talk about what good writers do when planning, composing, or revising. Genre-specific elements or parts (e.g., a good topic sentence) that make writing effective and fun to read are noted. Teachers and students discuss the strategy to be learned and establish its goals and benefits. Teachers and students explore how and when the strategy can be used, laying the foundation for generalization by not limiting the discussion to the current classroom or task at hand. The importance of student effort is emphasized to enhance motivation and facilitate the development of positive, adaptive attributions. Students make a commitment to learn the strategy and act as collaborative partners in this endeavor. Teachers may (this can be skipped or moved to a later point if appropriate) have students examine and graph their current performance (e.g., counting how many elements of opinion essays were included in essays written before SRSD instruction); this is done in a positive, collaborative manor with emphasis on changes that will soon be realized through strategy use. This is also a logical point to introduce goal-setting. Students are taught how to set personal, individual, and specific goals for (a) learning the strategy, (b) using the strategy, and (c) maintaining strategy use. Goals are revisited frequently during other stages. Materials supporting strategy use (e.g., mnemonic charts with strategy steps and graphic organizers for planning notes) and materials for supporting self-regulation (e.g., self-monitoring graphs) may be introduced at this stage or later.

Modeling. Modeling is critical to effective SRSD instruction. The teacher models aloud, demonstrating how and when to use the writing and self-regulation strategies throughout the writing process. The teacher models how to set specific goals for the writing task, self-monitor performance, and self-reinforce. Self-instructions for problem definition (I need to write an opinion essay with 8 parts), focusing of attention and planning (First, I need to pick an idea), strategy implementation (I know what to do, I do the first strategy step), self-evaluation (Did I include all strategy parts?), coping (I can do this, I know the strategy!), and self-reinforcement (Wow, I like this part of my essay!) are used by the teacher while modeling. After modeling, the teacher assists students in developing a short list of selected personal self-instructions to be used before, during, and after writing (for greater detail, see Harris & Graham, 1996). These self-instructions are recorded on a sheet of paper for use throughout instruction. Some students may need to have a strategy modeled multiple times; collaborative modeling and use of peer models can be used as appropriate.

Memorize it. Memorizing actually begins in the first stage, as students participate in fun and engaging activities to help them memorize the strategy steps (and corresponding mnemonics), the meaning of each step, and their personalized self-statements. At this point, teachers need to be sure that students have memorized these and understand their importance before moving into the next stage.

Support it. Initially, teachers support, or scaffold, students' use of the writing and self-regulation strategies as they compose together. Students gradually assume responsibility for the writing and self-regulation strategies; prompts, interaction, and guidance are faded over time with each individual student as he or she demonstrates independent and effective use of the strategy. Students self-monitor use of the writing strategy by determining the number of genre

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elements (additional goals can be set and monitored as well) they have included in their composition, comparing this to their goal, and graphing their performance. Students are encouraged to revise their graphic organizers and drafts to meet goals as needed. Students progress through this stage at different rates. Throughout this stage, the students and teacher continue to plan for and initiate generalization and maintenance of the strategies. This stage typically is the longest of the six stages for students who have significant writing difficulties.

Independent performance. To demonstrate independence, students are provided opportunities to use their writing and self-regulation strategies without teacher support or prompts. As noted earlier, booster sessions, where the strategies are reviewed, discussed, and supported again, can be used as necessary over time to maintain the strategies. To establish generalization, students should be given the opportunity to use the writing and self-regulation strategies they have learned in novel settings, with different teachers, and with other appropriate writing tasks.

SELF-REGULATION, SRSD, AND WRITING WITH STUDENTS WITH SPECIAL NEEDS

For typical writers, students who struggle with writing, and students with learning disabilities, the efficacy of SRSD is well established for some writing tasks (Graham & Harris, 2003; Rogers & Graham, 2008). Similar to students with LD, students with attention deficit hyperactivity disorder (ADHD) produce compositions that are short, poorly organized, and of low quality (Re, Pedron, & Cornoldi, 2007; Resta & Eliot, 1994). Students with ADHD struggle with self-regulation and have difficulty with executive functions (e.g., planning and organization), sustained attention, and strategic effort required by writing (Harris, Reid, & Graham, 2004). Additionally, they have difficulty developing, employing and maintaining effective strategies (e.g., Cornoldi, Barbieri, Gaiani, & Zocchi, 1999; Kofman, Larson, & Mostofsky, 2008). Students with emotional or behavioral disorders (EBD) often have serious deficits in writing as well (Nelson, Benner, Lane, & Smith, 2004).

For students with ADHD and EBD, there is a small but supportive evidence base for SRSD or similar approaches. Several recent single-subject design studies have reported positive effects for students with ADHD for narrative and expository writing (Jacobson & Reid, in press; Lienemann & Reid, 2008; Reid & Lienemann, 2006). Initial single subject design studies of SRSD for students with and at-risk for EBD have shown promising results in improving written performance (Lane et al., in press; Lane et al., 2008; Mason & Shriner, 2008). Additionally, Lane and her colleagues conducted a SRSD instructional randomized trial with elementary school students with or at-risk for BD (Lane et al., 2009), and found positive effects for length, completeness, and quality for narrative and persuasive writing. Some evidence of improved academic engagement in the general education classroom was also found.

Finally, there is preliminary evidence of effectiveness of SRSD or similar approaches for students with Asperger syndrome and autism spectrum disorder (Asaro & Saddler, 2009; Delano, 2007) and for students with mild mental retardation or cognitive impairment (e.g., Guzel-Ozmen, 2006). Although these students do not represent a homogeneous group, they often have similar difficulties with writing semantics and syntactic structures (Lewis, O'Donnell, Freebairn, & Taylor, 1998). Adaptations and modifications to typical SRSD instruction, however, may be needed for these students (Sandmel et al., in press). Clearly, additional research is needed with students with special needs. We turn now to other critical directions for future research.

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CRITICAL RESEARCH NEEDS

Although progress has been made in understanding and developing specific self-regulation processes in writing and in the implementation of SRSD, many questions remain to be addressed. We do not have, and badly need, research focusing on the long-term results of both development of individual self-regulation strategies and implementation of SRSD instruction across grade levels, in writing as well as in other domains. The longest term SRSD studies have involved teaching two writing strategies within a single school year (Graham, Harris, & Zito, 2005; Graham & Harris, 2003). We do not know how many genre-specific writing strategies, or self-regulation strategies, can effectively be taught in a school year at different grade levels, or how these strategies can be enhanced over the school years (cf. Harris & Graham, 1996). Parents and others could be partners in such long-term intervention, and research is needed here. Further, despite the relatively large number of studies involving SRSD, many writing genres and demands at different ages have yet to be addressed. No research to date has been conducted examining the contribution of SRSD to the larger writing curriculum; such research is clearly needed. While developing self-regulation processes and SRSD instruction help get students "on the playing field" for writing, research has not gone on to address how to take this beginning and continue development of expertise in writing.

Within the context of exploring comprehensive and sustained implementation, specific focus should be given to understanding how teachers come to understand, endorse, and effectively use strategy instruction (Harris et al., 2009). Researchers have argued that a focus on how teachers become adept at, committed to, and supported in strategy instruction is needed, as is more work aimed at filtering this approach into the schools. First, teachers must become knowledgeable of research supported practices; then they must decide if their classrooms and students are an appropriate match to the treatment and validating data; and finally, they must implement and evaluate the effects of the treatment with their own students. Adopting research-validated interventions can be challenging without adequate professional development and support, as it often requires teachers to change both their beliefs and their practices. Long-term research such as this is expensive, and funding is needed to support such efforts.

CONCLUSION

Neither the development of self-regulation processes for writing nor SRSD instruction should be thought of as a panacea for writing; promoting students' academic competence and literacy requires a complex integration of skills, strategies, processes, and attributes (Harris, 1982; Harris & Graham, 1996). Among skilled writers, writing is a flexible, goal-directed activity that is scaffolded by a rich knowledge of cognitive processes and strategies for planning, text production, and revision. Skilled writers engage in purposeful and active self-regulation of these processes and strategies. Much more research, using multiple methods, is needed to help us both understand skilled writing and promote its development.

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