Improving the Writing Performance of Young Struggling Writers:

Theoretical and Programmatic Research From the Center on Accelerating Student Learning

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This article describes the outcome and significance of studies in the area of writing conducted from 1999 to 2003 by the Center on Accelerating Student Learning (a multisite research center involving Vanderbilt University, Columbia University, and the University of Maryland). The basic purpose of the Center was to identify effective instructional practices for primary-grade students with special needs and children at risk for academic difficulties. As part of this effort, researchers at the University of Maryland surveyed primary-grade teachers nationwide to determine how they teach writing (providing a description of the context in which struggling writers learn to compose), examined the impact of extra handwriting and spelling instruction as a means for preventing writing difficulties, and assessed the effects of explicitly teaching young struggling writers strategies for planning and writing text.

The number of children with a writing disability is not known. However, data from the National Assessment of Educational Progress reveal that many students in the United States do not write well. In both 1998 and 2002, the majority of 4th-, 8th-, and 12th-grade students who completed this assessment demonstrated only partial mastery of the writing skills and knowledge needed at their respective grade levels (Greenwald, Persky, Cambell, & Mazzeo, 1999; Persky, Daane, & Jin, 2003). Writing problems are also common among children with special needs, as students with behavioral disorders, attention-deficit/hyperactivity disorders (ADHD), learning disabilities, and speech and language difficulties experience considerable difficulty learning to write (e.g., Gilliam & Johnston, 1992; Nelson, Benner, Lane, & Smith, 2004; Newcomer & Barenbaum, 1991; Resta & Eliot, 1994).

Unfortunately, current educational reform, as reflected in the No Child Left Behind Act (NCLB), places little emphasis on writing. In our opinion, this was an unfortunate oversight, as writing is critical to school success. It is the primary means by which students demonstrate their knowledge in school (Graham & Harris, 2004), but even more important, it provides a flexible tool for gathering, remembering, and sharing subject-matter knowledge as well as an instrument for helping children explore, organize, and refine their ideas about a specific subject.

Although writing is neglected by NCLB, other voices, such as the College Board, an organization of more than 4,300 colleges, warned that students and society will be short-changed if writing is not placed squarely in the center of the school-reform agenda (National Commission on Writing, 2003). They further noted that schools' attention to the teaching of writing "leaves a lot to be desired" (p. 14). An essential element in developing a comprehensive writing policy involves the identification of effective instructional procedures, especially when children are first learning to write and particularly for children experiencing difficulty with writing. This is important for two reasons. First, cases of writing failure due to poor teaching can be minimized if these students experience effective writing instruction right from the start. Second, such instruction can help to ameliorate the severity of writing difficulties experienced by other children whose primary problems are not instructional (Graham & Harris, 2002).

In this article, we describe a program of research designed to identify effective instructional practices for struggling writers in the primary grades. This research was conducted over a 5-year period (1999–2004), as part of a larger effort involving three research sites (Vanderbilt University, Columbia University, and the University of Maryland) funded as the Center on Accelerating Student Learning (CASL) by the Office of Special Education Programs in the U.S. Department of Education. The CASL researchers worked together to develop and scientifically test the effectiveness of instructional procedures in writing, reading, and mathematics for kindergarten through third-grade children with special needs and students at risk for academic difficulties. Our collaborative efforts provided not only an opportunity to receive feedback from each other on

proposed studies but also a richer synergy involving a shared set of assumptions and goals. One of the most important outcomes of this cooperative effort was that effective instructional procedures developed at one site were integrated across sites. For instance, the Vanderbilt site (Doug and Lynn Fuchs) incorporated the self-regulation technology employed by the Maryland site (Karen Harris and Steve Graham) into their peer-assisted learning strategies model (see, e.g., L. Fuchs et al., 2003). Conversely, the Maryland site incorporated more peer-assisted learning into their self-regulated strategy development model (SRSD; see, e.g., Graham, Harris, & Mason, 2004).

The research we conducted as part of CASL focused exclusively on writing. This included studies in three areas. First, primary-grade teachers nationwide were surveyed to determine how they teach writing, which provided a description of the context in which struggling writers learn to compose. Second, we exampled the impact of extra handwriting and spelling instruction as a method for preventing writing difficulties. Third, we assessed the effects of explicitly teaching struggling writers strategies for planning and writing text. Before presenting our investigations in each of these areas, we first consider the assumptions shared by CASL researchers that shaped this research, concentrating specifically on their implications for writing.

Assumptions

Instruction Should Address Multiple Aspects of Competence

One assumption that shaped the CASL program of research was that effective instruction in any academic domain cannot be unidimensional but must address multiple aspects of competence, including the teaching of multiple skills and strategies. In writing, as well as in other academic areas, there are a host of skills and strategic processes that students must master in order to achieve competence (Scardamalia & Bereiter, 1986). Thus, a critical issue in designing CASL research was identifying which skills and strategic processes should be the focus of investigation.

We decided to focus our instructional effort in two key areas: transcription skills (handwriting and spelling) and planning processes. Our decision to conduct research on the impact of providing extra handwriting and spelling instruction to struggling writers was based on previous research showing that these two skills account for 66% of the variance in primary-grade students' writing output and 25% of the variance in their writing quality (Graham, Berninger, Abbott, Abbott, & Whitaker, 1997). In addition, when handwriting and spelling demands are removed by having struggling writers dictate their compositions rather than write them out by hand, there is usually an improvement in output, writing quality, or both (see, e.g., Graham, 1990; MacArthur & Graham, 1987). Difficulty mastering these skills, therefore, may constrain writing performance.

In terms of writing processes, we decided to concentrate our instructional efforts on the area of planning for five reasons. First, planning is a critical aspect of learning to write, as skilled writers spend a considerable amount of time planning what they will do and say (Gould, 1980; Kellogg, 1987). Second, young struggling writers rarely plan in advance of writing and tend to minimize the amount of planning they do as they write (Graham, 1990; McCutchen, 1988). Third, there is some anecdotal evidence that even primary-grade children can be more planful when they learn to compose under favorable conditions (Cameron, Hunt, & Linton, 1996). Fourth, studies with older struggling writers show that strategy instruction in planning has a powerful effect on these students' writing performance (Graham & Harris, 2003). Fifth, a plan, especially a written plan developed in advance, provides an external memory, where a child can store ideas without the risk of losing them; this helps young writers overcome processing demands associated with handwriting and spelling, as these children lose ideas and plans they are trying to hold in working memory because their transcription skills are so slow (Graham & Harris, 2000).

The premise that effective instruction is multidimensional leads to more than just teaching multiple skills and strategies. It also involves enhancing students' knowledge and motivation. Current thinking about the development of expertise in subject-matter domains (see Alexander, 1997; Pintrich & Schunk, 1996) emphasizes that learning is a complex process that depends, in large part, on changes that occur in the learner's skills, strategic knowledge, domain-specific knowledge, and motivation (Alexander, Graham, & Harris, 1996). Thus, CASL researchers proceeded under the assumption that effective instruction should have a positive impact on behavior, cognition, and affect. In writing, we operationalized this assumption in two ways. First, in each instructional study, we assessed the impact of treatment on multiple outcomes. For example, in the planning strategy studies we assessed changes in at least three of the following areas: writing performance, strategic behavior, writing knowledge, and motivation (e.g., Graham, Harris, & Mason, in press). Second, writing treatments were designed so that behavior, motivation, and (where appropriate) cognition were enhanced (e.g., Harris, Graham, & Mason, 2004). For instance, planning strategies for writing were taught via the SRSD model (Harris & Graham, 1996). SRSD includes instructional components designed to improve students' written products (behavior), change how they compose (cognition), increase their knowledge about writing (cognition), and enhance their motivation (affect). Such instruction is responsive to the characteristics of students who experience difficulty with learning, as it addresses the multiple cognitive, behavioral, and affective challenges faced by these children (Harris, Graham, & Mason, 2003).

Treatments Should Be Multifaceted

CASL investigators also conducted instructional research under the assumption that effective treatments include multiple

instructional components. This was evident in the emphasis placed on changing behavior, cognition, and affect but was also actualized by developing treatments that included instructional components for promoting the acquisition, mastery, fluency, maintenance, and generalization of skills and strategies students were taught. For example, in the study involving extra handwriting instruction (Graham, Harris, & Fink-Chorzempa, 2000), students were provided considerable scaffolding as they initially learned how to form individual letters (acquisition); this scaffolding was faded during each instructional session (to help promote mastery); students practiced using these skills under timed conditions as they copied text (fluency and generalization); and students practiced the skills they were learning across multiple sessions (maintenance).

CASL researchers also recognized that learning how to apply a specific skill or strategy does not guarantee that students will use it when the opportunity arises or be able to adapt it to new and appropriate situations. People often do not make good use of what they have learned (Salomon & Globerson, 1987). This is especially true for children who experience academic difficulties (Wong, 1994). We addressed this issue in three ways. First, we asked whether the effects of our writing treatments were maintained over time and transferred to other aspects of literacy development. For instance, in the study involving extra spelling instruction (Graham, Harris, & Fink-Chorzempa, 2002), we assessed whether spelling effects were maintained for a 3-month period and transferred to reading and writing performance. Second, treatments were designed to promote maintenance and transfer (see the handwriting study described in the previous paragraph). Third, we assessed the added impact on planning strategy instruction of a peer support system designed to promote maintenance and generalization (Graham et al., in press; Harris, Graham, & Mason, 2004). This involved peers working together to identify new situations in which they could apply what they were learning, helping each other apply it in these situations, and discussing their successes and difficulties in doing so.

Treatments Should Be Feasible and Acceptable to Teachers

Another assumption that CASL researchers embraced was that teachers are unlikely to use an instructional procedure or approach if they do not view it as feasible and teacher friendly. Thus, when teachers implemented a treatment, we asked them to provide feedback on its acceptability (i.e., Harris, Graham, & Adkins, 2004). In some studies (e.g., Harris, Graham, & Mason, 2004), we also asked students to evaluate the treatment.

All Children Can Succeed

It must be noted that CASL research was mostly situated in urban schools serving a high percentage of children from low-income families. For instance, all of the students participating in the writing studies were attending urban schools, where a high percentage of children received a free or reduced-rate lunch. Although it is too often assumed that children in such schools do not do well academically, a shared assumption of all of the CASL researchers was that these children can succeed when they are provided with explicit and systematic instruction. In terms of writing, for example, we found that older elementary students in these same kinds of schools make considerable improvements when such instruction is provided (Graham & Harris, 2003).

Research Should Address Both Practical and Theoretical Issues

Finally, the work done by CASL researchers has implications for both practice and theory. In the case of the writing intervention studies, two practical questions were addressed: Does extra handwriting and spelling instruction help prevent writing difficulties? and Does explicit and systematic instruction in how to plan stories and persuasive essays improve the writing performance of struggling writers?

These studies also addressed important theoretical issues involving writing development. It is often assumed that handwriting, spelling, and planning play an important role in writing development and that difficulties acquiring these skills may contribute to writing disabilities (Graham & Harris, 2000). There are very little data with young children, however, that substantiate a causal link between these variables and writing. The instructional writing studies conducted as part of the CASL research tested this assumption by teaching each of these skills to students who were poor writers and determining if the treatment resulted in improvements for the targeted skills and improved writing performance in general. If this happened, then it provided evidence that the target skill or strategy is an important contributor to writing development (or conversely, to writing disabilities).

Writing Instruction in Primary-Grade Classrooms

Although it is commonly believed that classroom writing instruction is inadequate (National Commission on Writing, 2003), there is little actual data on how writing is currently taught at any grade level (for an exception, see Bridge, Compton-Hall, & Cantrell, 1997). As a result, we have little information on classroom writing practices, how much time students spend writing, or how teachers adapt their instruction for struggling writers. To obtain such information, we conducted three national surveys of primary-grade teachers' writing practices. The first survey focused on teachers' instructional practices in general (Graham, Harris, MacArthur, & Fink-Chorzempa, 2003), whereas the other two studies concentrated on the teaching of handwriting and spelling. In each survey, primary-grade teachers from a random sample across the United States were asked to respond to questions about their writing programs. For each survey, the response rate exceeded 60%, and there were no statistically significant differ-

ences between responders and nonresponders in terms of geographic location, size of school, grade level taught, or expenditures for student materials.

Although the use of surveys allowed us to build a broad picture of classroom writing practices, we were not able to independently verify that teachers' responses accurately reflected what they did in the classroom. We assumed that teachers would be aware of the elements of their teaching and would be able to relate this knowledge to questions about their teaching practices, just as other professionals can relate what they do when questioned (e.g., Diaper, 1989; Meyer & Booker, 1991). There is good reason to believe that teachers can do this, as other surveys examining teachers' beliefs and literacy practices are corroborated by findings from direct observations (Bridge & Hiebert, 1985; DeFord, 1985).

Writing Practices

In our first survey (Graham et al., 2003), we specifically asked primary-grade teachers to indicate how often they engaged in 19 specific writing activities and instructional procedures with their average and weaker writers. Each activity or procedure was selected because it was a common staple of primary-grade writing instruction (Graham & Harris, 2002), and it was reasonable to expect that teachers might adjust this activity when working with struggling writers. Teachers were asked to indicate how often they employed particular instructional activities (e.g., conferencing, mini-lessons, modeling, re-teaching) as well as how often they taught basic writing skills (e.g., handwriting, spelling, grammar) and writing processes (e.g., planning, revising, text organization). They were further queried about how often students worked together (e.g., helping each other and sharing their writing) and how frequently they encouraged children to engage in self-regulatory behavior (e.g., selecting their own writing topics, working at their own pace, using invented spellings). Teachers were also asked to identify any other adaptations they made for struggling writers beyond the 19 activities or procedures that they were asked about directly.

One hundred fifty-three general education teachers completed the survey (70% of teachers surveyed). They were almost equally divided among grade level (first, second, and third grade) as well as location (i.e., 35% urban, 36% suburban, and 29% rural). Not surprisingly, most of the teachers were female (95%), and they averaged 15.6 years of teaching experience. Average class size was 20, and teachers reported that 11% of their students were receiving special services.

There were a number of instructional activities that were common staples in these teachers' writing programs. Most teachers (78% or more) conferenced with students, taught mini-lessons, retaught skills and strategies, and modeled writing processes at least once a week. They also emphasized teaching basic writing skills, as handwriting, spelling words, strategies for spelling unknown words, capitalization and punctuation, and grammar were taught by 70% of teachers at least

several times a week. These teachers further focused their instructional efforts on the cognitive process of writing, as 75% or more taught planning and revising on at least a weekly basis, with 60% providing instruction on text organization skills at least once a week. Students in these classrooms also helped each other and shared their writing with peers, as 71% or more of the teachers reported that this occurred on at least a weekly basis. Finally, most teachers (75% or more) reported that they frequently encouraged students to select their own writing topics, work at their own pace, and use invented spellings. Surprisingly, students did not use computers for writing very often, as 60% of teachers indicated that this occurred only once a month or less (there was one computer to approximately every 8 students in these teachers' classrooms).

These findings have several implications for the intervention studies described later in this article. First, teachers thought that handwriting, spelling, and planning instruction were important, as this was a regular part of their writing programs. Thus, it is likely that they would be amenable to using scientifically validated procedures that support the development of these skills and processes. Second, even though these teachers emphasized both planning and transcription instruction, they devoted more attention to teaching writing skills than to teaching writing processes such as planning. For every hour that they reported teaching planning and revising, they spent 2.6 hours teaching basic writing skills. Consequently, primary-grade teachers may have a bias toward using treatments designed to improve transcription skills, even though there is more evidence available showing that strategy instruction in planning and revising has a positive and strong effect on writing performance (Graham & Harris, 2003). Third, students spent about 3 hours a week writing in these teachers' classrooms. Although this provided students with opportunities to apply the types of skills that were the target of our intervention studies, there was considerable variability in how often students wrote (SD = 2.2 hours), with children spending only 30 minutes a week writing in a few classrooms. It is unlikely that the treatment procedures described later would be maximally effective in classrooms where children do little writing.

When we looked at the adjustments or adaptations teachers reported making for the weaker writers in their classrooms, we found that too many teachers appeared to use a one-size-fits-all approach to writing instruction. As a group, participants averaged four adaptations per teacher, but 75% of all reported adaptations were made by just 29% of the teachers. There was also a sizable percentage of teachers who reported making no or only a few adaptations. One in every five teachers did not adapt his or her writing instruction, and one in four teachers made only one or two adaptations. Although the number and types of adaptations needed by struggling writers undoubtedly varies from one situation to the next, it is unlikely that teachers who do little to adapt their instruction will be effective in meeting the needs of their weakest writers. Struggling writers in these classrooms may be par-

ticularly vulnerable to continued writing difficulties, especially if the established instructional routine for teaching writing was developed without taking into account their individual needs.

Another area of concern was that one in every six adaptations that teachers reported making involved limiting the participation or decision making of struggling writers in some way. This most often involved restricting how frequently these students were allowed to choose their own writing topics, work at their own pace, help their classmates, or use a computer during the writing period. These restrictions may have been based on well-meaning concerns about the capabilities of struggling writers, but they may be counterproductive or unnecessary in some cases. For example, our CASL colleagues at Vanderbilt University have repeatedly demonstrated that academically less capable students can help their classmates (see D. Fuchs, Fuchs, Mathes, & Simmons, 1997).

Providing further support for our decision to focus our intervention efforts on handwriting, spelling, and planning was the finding that almost one half of all reported adaptations addressed one of these problems: Twenty-eight percent of all adaptations were dedicated to overcoming or circumventing transcription difficulties, whereas 17% provided assistance for planning or revising, with the majority of these focusing on planning. Another 20% of all adaptations involved the use of four instructional procedures: conferencing, reteaching skills and strategies, providing mini-lessons, and modeling writing processes. A variety of other adjustments were reported, ranging from providing extra one-on-one help to modifying writing assignments to providing extra encouragement. Overall, there was considerable variability in how teachers approached the task of making adaptations for struggling writers. No single adaptation was used by more than 40% of the teachers.

Finally, we examined a variety of school, class, program, and teacher variables, including teacher efficacy (Graham, Harris, Fink-Chorzempa, & MacArthur, 2001) and teachers' beliefs about writing instruction (Graham, Harris, Fink-Chorzempa, & MacArthur, 2002), to see if they predicted how many different types of adaptations teachers made for struggling writers. Only three variables made a statistically significant contribution to the prediction of teacher adaptations. These were percentage of students in the class receiving special education services, time students spend writing each week, and years of teaching experience. All together, the 10 variables entered into the regression analysis only accounted for 16% of the total variance. Clearly, additional research is needed to identify other factors that predict teacher adaptations for struggling writers.

Handwriting and Spelling Practices

We are still in the process of analyzing data from our national surveys of handwriting and spelling practices (Graham et al., 2004a, 2004b) and consequently review only some of the data from these studies here. For both the handwriting and spelling

studies, 169 first- through third-grade teachers completed the survey (68% of the teachers contacted in each study). Nearly all of the respondents were female (98% and 95% in the two studies, respectively), and they were almost equally divided among the three grade levels. In the handwriting study, the responding teachers were more likely to be located in suburban districts (40%) than in schools in urban (26%) or rural areas (34%), but in the spelling study, geographic location was roughly the same (36% urban, 34% rural, and 30% suburban). The teachers had considerable classroom experience, averaging 15.1 and 16.3 years of teaching experience in the two studies, respectively. The average class size was 25 in the handwriting study and 21 in the spelling study. Teachers reported that a sizable minority of students had difficulty with handwriting (18%) and spelling (26%), supporting the need for identifying effective instructional practices for teaching these skills to these students.

Other data from these two studies provided additional support for our decision to focus part of our research efforts on handwriting and spelling instruction for young struggling writers. Like teachers in the earlier survey, which examined writing practices more generally (Graham et al., 2003), the responding teachers believed that handwriting and spelling were important, as this was a regular part of their literacy programs. Ninety percent of the teachers who responded to the handwriting survey indicated that they taught handwriting, providing an average of 72 minutes of instruction a week. All but two of the teachers who completed the spelling survey indicated that they taught spelling, providing an average of 87 minutes of instruction a week.

The importance of handwriting was further supported by teachers' beliefs about the possible consequences for students who experienced difficulty mastering this skill (we did not ask a similar set of questions for spelling). The majority of teachers believed that difficulty mastering handwriting had a negative impact on how much children write (74%), the quality of their writing (66%), grades on written products (57%), and the time needed to complete assignments (80%).

Although teachers thought that handwriting and spelling are learned in part by having students read and write, they clearly thought that these skills must be directly taught. In the handwriting study, teachers indicated that direct instruction accounted for 56% of students' handwriting growth, whereas in the spelling study teachers indicated that 55% of students' growth was due to direct study of spelling words, spelling rules, and spelling–sound associations. Despite the importance that teachers placed on directly teaching transcription skills, only 19% of teachers in the handwriting study indicated that they looked forward to teaching these skills, and 80% indicated that they had minimal to no preservice preparation in how to teach them. Unfortunately, we did not ask teachers in the spelling study these same two questions about spelling.

Finally, about two thirds (64%) of the surveyed teachers indicated that they used a commercial program to teach handwriting, whereas slightly more than one half of teachers (56%)

did the same in spelling. One possible area of concern for struggling writers was that 93% of teachers indicated that handwriting instruction was typically directed to the whole class, whereas 37% of teachers indicated that spelling instruction was the same for all students.

Interventions for Handwriting and Spelling

Although there is considerable research on teaching handwriting and spelling to struggling writers and children with learning problems (see Graham, 1999), little is known about the impact of such instruction on these students' overall writing development (Graham & Harris, 2000). The survey studies reviewed previously (Graham et al., 2003; Graham et al., 2004a, 2004b) revealed that primary-grade teachers believe that directly teaching these skills to developing writers is important and that, at least in terms of handwriting, failure to master basic transcription skills can have a negative impact on children's writing.

Theoretically, handwriting or spelling difficulties may hamper children's writing in several different ways (Graham, 1990; Scardamalia & Bereiter, 1986). First, having to consciously attend to transcription skills when writing may tax a child's processing memory (see Berninger, 1999), interfering with other writing processes, such as generating content or planning. For example, having to switch attention during writing to mechanical demands, such as having to think about how to spell a particular word, may lead the child to forget plans or ideas already held in working memory, influencing writing output. Simultaneously allocating attention to spelling words while planning the next unit of text during writing may also affect the coherence and complexity of content integration, influencing the overall quality of writing. It is further possible that there are fewer opportunities to make expressions more precisely fit intentions at the point of translation, if attention is occupied with spelling concerns, affecting the process of translating ideas or words into sentences.

To determine if difficulties with transcription skills hamper children's writing performance, we designed two experiments in which young struggling writers received extra instruction in handwriting or spelling (Graham et al., 2000; Graham, Harris, & Fink-Chorzempa, 2002). If transcription difficulties interfere with writing as theory suggests, then students who receive extra handwriting or spelling instruction should not only become better at these skills than control students (who receive instruction in phonological awareness or mathematics, respectively); there should also be corresponding improvements in their writing output, writing quality, and sentence construction skills. For the study involving extra spelling instruction (Graham, Harris, & Fink-Chorzempa, 2002), we further looked for a corresponding improvement in two important reading skills: word attack and word recognition. This was based on Ehri's (1989) proposal that spelling

contributes to reading development by shaping children's phonemic awareness, strengthening their grasp of the alphabetic principle, and making sight words easier to remember.

In addition to examining the theoretical links between text transcription skills and children's writing performance (and reading in the spelling study), these two experiments addressed an important practical issue. How can we prevent writing difficulties? Although work by Englert and her colleagues (Englert et al., 1995) demonstrated that a well-designed literacy program can have a positive impact on the writing performance of primary-grade children who experience learning difficulties, there is very little data on that skills or aspects of instruction that need to be emphasized to prevent writing problems. Several previous studies have shown that instruction in handwriting (Berninger et al., 1997; Jones & Christensen, 1999) and spelling (Berninger et al., 1998) can facilitate first and second graders' writing development. The finding that there were transfer effects from handwriting and spelling to writing in these investigations suggests that supplementary instruction in either of these skills during the primary grades may be an important element in prevention efforts.

Extra Handwriting Instruction

We screened 310 first-grade children in 12 classrooms in four urban schools to identify students at risk for handwriting problems. In each class, students copied a short sentence as many times as they could in a 90-second period. All children whose handwriting fluency (number of letters correctly written) was in the bottom quartile of their class and who were also identified by their teacher as having a handwriting problem were included in the study. These 38 children were randomly assigned to an experimental (extra handwriting instruction) or control (phonological awareness instruction) condition. The children were mostly Black (71%), and 48% of them received a free or reduced-rate lunch. These distributions were consistent with those of the student body of the participating schools. Fourteen (37%) of the students had a disability (most commonly speech and language difficulties) and an additional 18 students (47%) received reading recovery instruction. Furthermore, all of the participants, according to their teachers, were experiencing difficulties learning to write, and the results of a norm-referenced standardized writing test were consistent with the teachers' evaluation.

Students in both conditions were individually instructed by graduate students majoring in education. Each instructor taught students from both conditions to control for possible teacher effects. The instructor met with each student three times a week (15 minutes each time) for 9 weeks.

The handwriting treatment was designed to teach children how to write lowercase manuscript letters accurately and fluently. This was accomplished through four instructional activities that were included in every lesson (see Table 1). Each lesson began with a warm-up activity (Activity 1) designed to teach students to name each letter of the alphabet, match let-

ter names with their corresponding symbols, and identify where each letter in the alphabet was placed. This was followed by instruction and practice in writing individual letters (Activity 2). Every three lessons (i.e., every unit), a new set of letters was introduced. Letters that were formed using similar strokes were grouped together for instruction (e.g., *l, i, t* or *a, e, o*) and sequenced so that letter sets that were easier to learn and occurred more frequently in children's reading material were taught first. Letter instruction involved modeling how to form each of the letters in the set and discussing how they were formed, followed by practice tracing, copying, and writing each letter, with the student circling his or her best formed letters. The only major difference across the three lessons was that students practiced writing the letters in words after the first lesson.

In these same three lessons, students copied a sentence (Activity 3) that contained multiple instances of the letters being taught in that unit (e.g., "Little kids like to get letters" for the letters *l, i, t*). During the first of the three lessons, students copied the sentence, quickly and without making mistakes, for a period of 3 minutes. They then recorded their performance on a graph. During the next two lessons they

were directed to do the same thing but to write a little faster. Again their performance was graphed and the teacher drew a big star on their graph whenever they met the goal for writing faster. During the fourth activity, students were taught how to write one letter from the unit in an unusual way (e.g., as long and tall) or use it as part of a picture (e.g., turning the letter *i* into a picture of a butterfly).

Handwriting-instructed students outperformed their counterparts in the control condition on measures assessing not only handwriting but writing skills as well. Immediately following instruction, handwriting-instructed students were more accurate in naming (effect size = 0.86) and writing the letters of the alphabet (effect size = 0.94), and they were also able to produce the letters of the alphabet (effect size = 1.39) and copy connected text more fluently (effect size = 1.49). With the exception of copying text more fluently, these handwriting gains were maintained 6-months later (all effect sizes > 0.65). Even more significantly, extra handwriting instruction resulted in immediate as well as more long-term improvements in students' writing. In comparison with control students, handwriting-instructed students were more skilled at constructing sentences immediately following instruction (ef-

TABLE 1. Typical Instructional Unit for the Handwriting and Spelling Treatments

Handwriting	Spelling
Unit 1: Lesson 1 (letters *l, i,* and *t*) • Alphabet Warm-Up (practice naming, matching, and sequencing alphabet letters) • Alphabet Practice (practice writing unit letters in isolation) • Alphabet Rockets (repeated writing of sentence containing unit letters during a 3-minute time frame; student records number of letters written) • Alphabet Fun (instructor models how to make a unit letter in a funny way)	**Unit 1: Lesson 1** (short vowels *a, e,* and *i*) • Word Sorting (to discover cvc pattern for short vowels involving *a, e,* and *i*) • Word Hunt (students encouraged to look for words in their regular reading and writing material that fit the patterns emphasized during Word Sorting)
Unit 1: Lesson 2 (letters *l, i,* and *t*) • Alphabet Warm-Up (practice naming, matching, and sequencing alphabet letters) • Alphabet Practice (practice writing unit letters in isolation and within words) • Alphabet Rockets (student repeatedly writes the sentence from Lesson 1 for 3 minutes, trying to go three letters faster; student records number of letters written) • Alphabet Fun (instructor models how to write another unit letter in a fun way)	**Unit 1: Lessons 2–5** (short vowels *a, e,* and *i*) • Phonics Warm-Up (practice identifying the letters that make consonant and short vowel sounds, blends, and digraphs) • Word Study (practice studying eight spelling words that fit the patterns emphasized in that unit; practice involved both traditional study procedures and a game format) • Word Building (practice building words with onset and rime cards, for example, a card for the rime *at,* that were emphasized in the unit) • Word Hunt (students identify words that fit the patterns emphasized in the unit)
Unit 1: Lesson 3 (letters *l, i,* and *t*) • Alphabet Warm-Up (practice naming, matching, and sequencing alphabet letters) • Alphabet Practice (practice writing unit letters in isolation and rhyming words) • Alphabet Rockets (student repeatedly writes the sentence from Lesson 1 for 3 minutes, trying to go three letters faster than speed in Lesson 2; student records performance) • Alphabet Fun (instructor models how to write the final unit letter in a fun way)	**Unit 1: Lesson 6** (short vowels *a, e,* and *i*) • Review (review of patterns emphasized in previous units) • Assessments (unit tests)

fect size = 0.76) and 6 months later (effect size = 0.70). Handwriting instruction also had a positive impact on writing output (effect size = 1.21), as handwriting-instructed students produced more writing content under timed conditions than their control counterparts did when writing a story (this measure was not administered at maintenance). Consequently, the mastery of handwriting skills not only appears to facilitate the initial process of learning to write, as demonstrated by the findings from this and previous studies (Berninger et al., 1997; Jones & Christensen, 1999), but may also affect the outcomes of the learning process over time, at least up to a period of 6 months.

Extra Spelling Instruction

At the start of the school year, we screened 291 second-grade children in 12 classrooms in four urban schools to identify students at risk for spelling problems. The children's classroom teachers administered the screening measure, the spelling subtest from the *Wechsler Individual Achievement Test* (WIAT; Wechsler, 1992). All children who scored at or below the 25th percentile on the WIAT and were also identified by their classroom teacher as having a spelling problem were included in the study. These 60 children were randomly assigned to an experimental (extra spelling instruction) or control (extra mathematics instruction) condition. The children were mostly Black (65%), and 65% of them received a free or reduced-rate lunch. These statistics mirrored the makeup of the student body of the participating schools. Twenty-three of the students had a disability (most commonly speech and language difficulties). Furthermore, as a group, these students were at risk for writing and reading difficulties, according to their performance on norm-referenced standardized tests.

Students in each condition received instruction from a graduate student majoring in education. Instruction was delivered to pairs of students, and each instructor taught pairs of students from each condition. The instructor met with each pair of students three times a week (20 minutes each time) for a period of 16 weeks.

The spelling treatment was designed to teach children basic sound–letter combinations, spelling patterns involving long and short vowels, and common spelling words that fit these patterns. This was accomplished through five different instructional activities that were included in a repeating 6-day lesson cycle or unit (see Table 1). In the first lesson of each unit, students participated in a word-sorting activity (Activity 1) designed to help them learn rules for two or more spelling patterns (e.g., short vowel sound for /a/ in *mad* and long vowel sound for /a/ in *made*). Word sorting involved introducing a master word for each pattern (i.e., *mad* and *made*), emphasizing how the master words differed (in terms of sound and orthography), placing other words that fit these patterns under the appropriate master word, constructing a rule for each pattern, and generating other words that fit the patterns. At the end of Lesson 1, the two students were encouraged to "hunt"

for words in their regular classroom that fit these patterns (Activity 2). During each subsequent lesson, students shared the words they found with their partners.

In Lessons 2 through 5 of each unit, the student pairs participated in three additional activities. At the start of the lesson, they completed a phonics warm-up (Activity 3) in which they took turns identifying the sound–letter correspondences for consonants, blends, digraphs, and short vowels. Students also studied eight new spelling words that fit the patterns emphasized in that unit (Activity 4). Students initially studied their words independently using a learning strategy they were taught, but by Lesson 4 of each unit they studied words with their partners by playing a game, such as tic-tac-toe, that required them to produce the written spelling of a word in order to complete a move. Furthermore, students worked with their partners to build words that corresponded to the spelling patterns emphasized in that unit (Activity 5). This involved adding consonants, blends, or digraphs to a rime (e.g., *at* and *ate*) to build as many real words as possible.

In the final lesson of each unit, students were tested on the spelling words they were studying in that unit. In addition, the student pair reviewed spelling concepts taught in the previous unit.

Spelling-instructed students made impressive gains in their spelling performance. They outscored their math counterparts in the control condition on three norm-referenced spelling tests administered immediately following instruction (effect sizes ranged from 0.66 to 1.05) and 6 months later (effect sizes ranged from 0.70 to 1.07). Students also mastered the words they studied during each spelling unit, as they correctly spelled almost 90% of these words at the end of each unit and continued to spell 84% of them 2 weeks later. Spelling-instructed students were more adept than their peers in the control condition at correctly identifying sound–letter combinations (effect size = 0.70) as well as correctly spelling words that included the rimes they used during the word-building activity (effect size = 2.86). Thus, the experimental treatment was effective in improving the spelling performance of these poor spellers.

The study also provided some evidence to support the hypothesized links between spelling and learning to write and read. Immediately following instruction, spelling-instructed students were better at constructing sentences (effect size = 0.78) and decoding nonsense words (effect size = 0.82) than students in the control condition. These advantages were not evident, however, 6 months later. Nevertheless, transfer effects to word recognition were evident at this point for students who had the lowest word recognition scores at the start of the experiment. Although extra spelling instruction did not influence long-term outcomes for most of the writing and reading skills assessed in this study, it did facilitate the initial acquisition of two critical writing and reading skills. For children who find writing and reading challenging, improvements in their sentence writing and word attack skills are significant, as both of these skills are essential building blocks in literacy

development (see Adams, 1990). Similarly, improvements in word recognition skills, even when they take longer to accrue and are limited to children who have the most difficulties with these skills, are beneficial.

Planning-Strategy Instruction

Although there is considerable research demonstrating that planning-strategy instruction is effective with poor writers in 4th through 12th grades (see, e.g., Graham & Harris, 2003), we were unable to locate any investigations that looked at such interventions with struggling writers in the primary grades. Despite the demonstrated benefits of such instruction with older students, this approach might not be beneficial for younger children. McCutchen (1988) argued that handwriting and spelling are so demanding for young writers that they minimize other writing processes, such as planning, because they exert considerable demands as well. Thus, bootstrapping planning strategies into a system that is already heavily taxed by other demands may overload the child's processing capabilities. In a series of four studies conducted with 3rd- and 2nd-grade struggling writers, we examined whether this was indeed the case.

One way to ease the processing demands associated with incorporating new procedures into a heavily taxed cognitive system is to explicitly demonstrate how to apply these new tools and then scaffold instruction so that children move from using them with the help of a skilled other (e.g., the teacher) to applying them efficiently and effectively on their own. The approach that we used to actualize this goal was the SRSD model (Harris & Graham, 1996), which we developed specifically for this purpose. This model has been used successfully to teach academic strategies to children with and without learning difficulties in more than 30 studies (Graham & Harris, 2003; Wong, Harris, Graham, & Butler, 2003). With this approach, children are explicitly and systematically taught strategies for accomplishing specific tasks, such as writing a story. Students are also taught the information or skills needed to use these strategies. They further learn how to use self-regulation procedures such as goal setting, self-monitoring, self-reinforcement, and self-instructions to help them manage the writing strategies and task of writing as well as to obtain concrete and visible evidence of their progress.

SRSD instruction is designed to promote students' independent use of the target strategies and accompanying self-regulation procedures. Instruction is scaffolded so that responsibility for recruiting and using the target strategies, accompanying knowledge or skills, and self-regulation procedures gradually shifts from instructor to students. Children are treated as active collaborators in the learning process, and the role of student effort in learning the strategies is emphasized and rewarded. Feedback and instructional support are individualized by the instructor so that they are responsive to students' needs. Furthermore, instruction is criterion- rather than time-based, as children move through each instructional stage at their own pace and do not proceed to later stages of instruction until they have met initial criteria for doing so.

Another way to increase the likelihood that children will incorporate new planning tools into their existing routines (even a heavily taxed one) is to teach planning strategies that have a high likelihood of producing a positive effect on students' writing. Children are more likely to continue to use these tools, even though they require more effort than the children's existing approach, if the procedures result in improved performance (the SRSD model makes gains from strategy use evident by having students monitor and graph changes in their writing performance). In the four studies reported in this section, students were taught one or more genre-specific planning strategies that had a strong positive effect on the writing of slightly older struggling writers (see Danoff, Harris, & Graham, 1993; Sexton, Harris, & Graham, 1998). This included a strategy designed to help students generate ideas or notes for each of the basic parts of a story in advance of writing. Students asked themselves the following questions represented by the mnemonic *WWW, What = 2, How = 2: W*ho are the main characters? *W*hen does the story take place? *W*here does the story take place? *What* do the main characters want to do? *What* happens when the main characters try to do it? *How* does the story end? *How* do the main characters feel? For some of the studies (Graham, Harris, & Mason, in press; Harris, Graham, & Mason, 2004), students were also taught a genre-specific strategy for planning a persuasive essay, represented by the mnemonic *TREE*. This strategy prompted students to *T*ell what you believe (State your topic sentence), give three or more *R*easons (Why do I believe this?), *E*nd it (Wrap it up right), and *E*xamine (Do I have all of my parts?). It should be noted that this version of *TREE* was not used in our first study with third graders (Graham et al., in press). In that study, the last two steps reminded children to *E*xplain reasons (Say more about each reason) and *E*nd it (Wrap it up right). We modified the strategy when we used it with second graders (Harris, Graham, & Mason, 2004), because many of the third-grade children had had difficulty generating explanations in the prior study.

The genre-specific planning strategies for both stories and persuasive essays were embedded in a more general planning strategy that prompted students to carry out three basic processes: *P*ick a topic to write about, *O*rganize possible ideas into a writing plan, and *W*rite and keep planning (the mnemonic *POW* was used to remind students to carry out each of these processes). Students were directed to use the genre-specific strategy as part of the second step of *POW: O*rganize possible ideas into a writing plan.

In addition to finding out if young struggling writers could integrate new planning strategies into their existing approach to writing, we were further interested in improving the SRSD model. Students' learning how to apply a strategy does not guarantee that the students will use it when an opportunity arises or be able to adapt it to new, but appropriate, situ-

ations (Wong, 1994). When we designed the SRSD model (Harris & Graham, 1996), we assumed that maintenance and transfer would be problematic for some students, and consequently we integrated a number of procedures into the model that were designed to promote these two aspects of learning. These included continuing instruction until students can use the strategy correctly and efficiently, helping them understand how the strategy works and provides an improvement over their current routine, asking them to monitor the impact of the strategy on their performance, working with them to identify when and where the strategy can be used and how to modify it for these situations, encouraging them to set goals to use the strategy, teaching them to use self-statements as a means to reinforce strategy use and cope with difficulties, and discussing with them how their application efforts fared.

Analysis of effect sizes for SRSD writing studies (Graham & Harris, 2003) suggests that our prior efforts to facilitate maintenance and generalization were relatively successful. Effect sizes for SRSD-instructed students ranged from moderate to large when children's performance was tested over time, in new settings, or across genres. Nevertheless, some children still continued to experience difficulty maintaining and transferring what they learned (Graham, Harris, & Troia, 1998). Thus, we were interested in tweaking the SRSD model in order to make it even more robust. To do so, we drew on a concept used by other CASL researchers, namely, peers helping each other (D. Fuchs et al., 1997). This involved adding an instructional component to SRSD in which two students worked together to support strategy use, maintenance, and generalization. Periodically throughout instruction, the two children identified other places or instances in which they could use all or part of the strategies they were learning and considered how they might need to modify these procedures for the identified situations. They were then encouraged to apply what they were learning to these situations, with the added provision that they help each other do so (if needed). In subsequent SRSD instructional sessions, the two students identified when, where, and how they applied the strategies, indicating how the strategy helped them do better as well as detailing any problems they encountered. They also identified any instance in which they helped their partner. To examine the added benefits of this peer support component, we conducted two studies to determine if including it in the SRSD model augmented students' knowledge of writing and writing motivation as well as their writing performance at posttest, over time, and to uninstructed genres (Graham, Harris, & Mason, 2004; Harris, Graham, & Mason, 2004).

In the first three studies (Graham et al., in press; Harris, Graham, & Mason, 2004; Saddler, Moran, Graham, & Harris, 2004), instruction was delivered by graduate students majoring in education. This allowed us to rigorously test and fine-tune the planning strategy intervention as well as to determine the added benefits of the peer support component before conducting an even more stringent assessment involving randomized field trials with teachers (Harris, Graham, & Adkins, 2004). As we moved instruction from third grade to second grade,

we modified the genre-specific strategy for writing a persuasive essay, added instruction on how to use transition words when writing, and simplified the instructions in the lesson plans (lesson plans can be obtained from the authors or online at http://www.education.umd.edu/literacy/srsd/srsd.htm). Finally, it is important to note that all of the children who participated in the four studies described next scored at the 25th percentile or below on the norm-referenced *Test of Written Language–3* (Hammill & Larsen, 1996) and were identified as having writing problems by their teachers.

Study 1

In the first planning strategy study (Graham, Harris, & Mason, 2004), 73 third-grade children from four urban schools were randomly assigned to three conditions: SRSD planning instruction (i.e., SRSD only), SRSD planning instruction plus peer support (i.e., SRSD plus peer support), or control. Over the course of this 5-month investigation, one child from the control condition moved to another school. Seventy-five percent of the children were Black, 67% received a free or reduced-rate lunch, and 26% received special education services. Instruction was delivered by six graduate students.

Before instruction began, students wrote papers for four genres: story, persuasive, personal narrative, and informative writing. They further completed measures assessing their knowledge of writing and writing self-efficacy. Following these assessments, children in the two SRSD conditions learned how to plan and write a story using *POW* and the story part strategy, whereas students in the control condition received their regular writing program (i.e., Writers' Workshop: This is the most popular approach to writing instruction in the primary grades; see Pritchard, 1987). SRSD instruction in story writing took approximately 6 hours to complete (students worked in pairs with an instructor three times a week for 20 minutes per period). Once instruction ended, students wrote a story and personal narrative, allowing us to find out if the two SRSD treatments had a positive and differential impact on story writing as well as to determine if treatment effects transferred to personal narratives.

Students in the two SRSD conditions then learned how to plan and write a persuasive essay, using *POW* and *TREE* (control students continued with Writers' Workshop). Instruction was slightly more efficient with this second genre, as it was about 5 hours in duration. Following instruction, students wrote a story, persuasive essay, and informative paper. The story served as a maintenance measure, whereas the other two papers allowed us to examine again the differential impact of the two SRSD treatments on an instructed genre (persuasive writing) as well as transfer effects to an uninstructed one (writing to inform). At this point, knowledge of writing and self-efficacy were reassessed.

Teaching third-grade struggling writers how to integrate new planning tools into their approach to writing had a positive impact on students' writing, knowledge, and motivation. Following instruction, students in both SRSD conditions spent

more time writing (a measure of persistence) and produced stories and persuasive essays that were longer, more complete, and qualitatively better than those produced by their peers in the control condition (effect sizes were large, ranging from 1.46 to 3.23). With one exception (story length), the impact of this instruction was durable, as positive effects were maintained over time for story writing for both SRSD conditions (effect sizes were large, ranging from 0.81 to 1.60). Students in the two SRSD conditions were also more knowledgeable about writing in general (effect sizes were moderate to large, ranging from 0.55 to 2.20) and the parts of a persuasive essay in particular (effect sizes were large, exceeding 1.00).

Although the SRSD-only condition enhanced both story and persuasive writing, it did not have a correspondingly positive impact on personal narratives, one of the uninstructed genres. One possible reason for this lack of transfer involved our decision at the start of the study to remove two components from the typical SRSD model: overt encouragement by the instructor for students to use the strategies outside the treatment setting as well as discussion about when, where, and how to use the learned strategies. This was done to eliminate overlap between the two SRSD conditions. The removal of these components may have weakened the impact of the SRSD-only condition, especially in terms of generalization.

Even with the removal of these two components, the SRSD-only condition was still powerful enough to facilitate transfer to informative writing, once students had practiced applying the planning strategies with a second genre (i.e., persuasive writing). SRSD-only students' informative papers were longer and qualitatively better than those produced by controls (effect sizes were large: 1.57 for words and 1.08 for quality). Not surprisingly, children in the SRSD plus peer support condition also wrote informative papers that were longer and qualitatively better (both effect sizes were large: 1.58 for words and 1.15 for quality) than those written by controls.

We further found that there were some advantages to adding the peer support component to SRSD. In contrast to the SRSD-only condition, SRSD plus peer support students included more story elements in their narratives (effect size = 1.28) and spent more time writing their informative papers (effect size = 1.20) than did controls. In addition, the peer support component enhanced knowledge of writing, as students in the SRSD plus peer support condition were able to better describe how to plan a paper than students in both the SRSD-only and control conditions (both effect sizes exceeded 1.78). Consequently, this initial experiment provided a positive incentive for us to continue our investigation on planning strategy instruction and the value of the peer support component with even younger writers.

Studies 2 and 3

Before conducting a large-group study with slightly younger students, we first ran a small-scale test of the effectiveness of planning-strategy instruction, using just *POW* and the story part strategy, with 6 second-grade struggling writers from two

classrooms in a single urban school (Saddler et al., 2004). The effects of this treatment (which did not include the peer support component) were assessed through a multiple-baseline-across-subjects design with multiple probes during baseline. This study provided an initial confirmation that such instruction can have a positive impact on the writing of such students, as collectively their stories became more complete and qualitatively better following treatment and at maintenance as well. In contrast to Study 1, the positive effects of treatment transferred to narrative writing (an uninstructed genre), as all but one student's posttreatment narratives were more complete and qualitatively better.

Our next step was to replicate Study 1 with second-grade struggling writers (Harris, Graham, & Mason, 2004). Sixty-six second-grade students from 12 classrooms in four urban schools were randomly assigned to SRSD only, SRSD plus peer support, or control (Writers' Workshop). During the course of the study, 2 children in the control condition and 1 student in the SRSD plus peer support condition moved. Seventy-eight percent of the children were Black, 57% received free or reduced-rate lunch, and 20% received special education services. Instruction was delivered by six graduate students.

One difference between this investigation and Study 1 was that we made some changes in the genre-specific strategy for persuasive writing as well as in instruction (these were described earlier). We also asked each participant's classroom teacher to rate the child's effort and intrinsic motivation before and after instruction was completed (planning-strategy instruction had no effect on student self-efficacy in Study 1, but did affect persistence). Teachers were further asked to administer a persuasive writing probe in their own classrooms once treatment ended, providing a measure of transfer to the child's regular class. In addition, we sought to strengthen the peer support component by having the instructor work directly in the child's regular classroom on two occasions to support transfer to that setting.

As in Study 1, teaching struggling writers how to integrate new planning tools into their approach to writing had a positive impact. Following instruction in story writing and then persuasive writing, SRSD-only students wrote more complete stories (effect sizes were large, exceeding 1.51) as well as longer, more complete, and qualitatively better essays (effect sizes were large, exceeding 1.30) than did children in the control condition. They were also more knowledgeable than controls about how to plan a paper and about the features of a persuasive paper (effect sizes were large, exceeding 0.96).

In contrast to the third-grade students in Study 1, SRSD-only students in this investigation did not write posttest stories that were longer and qualitatively better than those produced by controls. At maintenance, however, SRSD-only students' stories were longer, more complete, and qualitatively better than those of their peers in the control condition (effect sizes were moderate to large, ranging from 0.47 to 1.46). It is possible that the younger second-grade students in this study did not do as well on the posttest story as the third-grade children in Experiment 1 because they were not able to integrate the

relatively sophisticated planning strategies they were taught into their existing approach to writing. This argument was weakened, however, by the findings that the SRSD-only students in this investigation made improvements that were similar to their third-grade counterparts in Study 1, once they had additional practice applying planning strategies to a second genre, persuasive writing. Perhaps a better explanation for this discrepancy is that younger students needed more practice applying the basic strategic actions (i.e., selecting topics, generating and organizing notes, and writing and saying more) and self-regulatory procedures (e.g., self-instruction, goal setting, and self-monitoring) they were learning before they could take full advantage of them. If this argument was valid, then it should be reflected in the maintenance story probe, as students received additional practice applying these processes to a second genre (persuasive writing) before maintenance was assessed. The maintenance data were consistent with this explanation.

SRSD-only students did generalize what they were learning to their regular classrooms, as the persuasive essays they wrote in this setting were qualitatively better than the ones produced by controls (effect size = 1.16). Transfer to narrative writing occurred too, as SRSD-only students wrote more complete personal narratives than did their peers in the control condition (effect size = 1.15). There were, however, no transfer effects to informative writing for SRSD-only students.

Adding the peer support component to the SRSD condition was advantageous for the students in this study. Not only did these children evidence all of the advantages over controls that SRSD-only students did (effect sizes were large and all exceeded 0.87), but their posttest stories were longer and qualitatively better, their classroom generalization persuasive papers were more complete, and their informative stories were qualitatively better (effect sizes were large, with all exceeding 0.86) than the ones produced by controls. Finally, SRSD plus peer support students wrote more complete persuasive essays following instruction than did SRSD-only students (effect size = 0.83), and their narrative papers were more complete as well (effect size = 0.85).

In summary, Studies 1, 2, and 3 provided strong evidence that teaching young struggling writers how to integrate new planning tools into their approach was a good idea (at least when such instruction was delivered by graduate students). In addition, Studies 1 and 3 demonstrated that the peer support component enhanced SRSD instruction Consequently, our fourth and final planning strategy instruction investigation sought to determine if these same kinds of effects were realized when second-grade teachers delivered the SRSD plus peer support condition to struggling writers in their classrooms.

Study 4

We contacted all of the second-grade teachers ($N = 12$) in four urban schools to ask them if they would be willing to partic-ipate in a study in which they taught planning strategies to the struggling writers in their classrooms (Harris, Graham, & Adkins, 2004). Nine of the teachers agreed to participate (one teacher declined because it was her first year teaching, another was not able to participate because she was going on maternity leave, and one teacher was not interested in being part of the project). In two of the schools, the special education teachers were considered to be part of the second-grade team, and they agreed to participate as well (the special education teachers were not contacted in the other two schools).

Across the 12 teachers' classrooms, 55 children scored at the 25th percentile or below on a norm-referenced writing test and were also identified as having a writing problem by their teachers. We obtained consent for participation in the study for all but 2 of these students. The remaining 53 children were randomly assigned by teacher to planning strategy instruction (SRSD plus peer support) or the control condition. During the course of the study, 2 students in the control condition moved, leaving us with 27 SRSD plus peer support students and 24 controls. Sixty-eight percent of the children were Black and 18% received special education services (43% of the children in the four schools received free or reduced-rate lunch).

The writing program in all of the teachers' classrooms revolved around Writers' Workshop (see Pritchard, 1987). All of the teachers had used the Writers' Workshop approach for several years and in interviews with project staff indicated their commitment to this approach and their belief that it was an effective method for teaching writing. Part of Writers' Workshop involves conducting mini-lessons aimed at addressing specific students' needs. SRSD plus peer support was integrated into the teachers' writing programs, as a series of mini-lessons offered three times a week (at 20 minutes per lesson). Only students assigned to SRSD plus peer support participated in these mini-lessons (group size ranged from 2 to 4 students). When teachers in Writers' Workshop delivered mini-lessons to small groups of students, the other children (including the controls) continued to work on their own compositions, planning, drafting, revising, editing, sharing, and publishing them. Graduate students observed the writing period throughout the course of the study. These observations confirmed that planning-strategy instruction was delivered as intended and that this treatment did not "bleed" into Writers' Workshop for the other students.

Children in the SRSD plus peer support condition were taught how to plan a story, using *POW* and the story part strategy (we had planned for teachers to do *POW* and *TREE* as well, but repeated disruptions caused by inclement weather and a sniper in the Washington, D.C., area made this impossible). Prior to the start of instruction, students wrote a story and personal narrative (pretests), and teachers made judgements about each student's effort and intrinsic motivation for writing. Once instruction ended, teachers completed the motivational measures again, and students wrote another story and personal narrative (posttests). A third story was produced 1 month later (maintenance).

Consistent with the three previous studies, students in the SRSD plus peer support condition wrote more complete and qualitatively better stories at posttest than did their peers in the control condition, and these gains were maintained 1 month later (all effects sizes were large, exceeding 0.88). Just as important, the effects of instruction transferred to an uninstructed genre, as the personal narratives written by SRSD plus peer support students were qualitatively better and more complete than the stories produced by controls (both effect sizes were large, exceeding 0.87). Planning-strategy instruction also had a positive impact on teachers' judgements about students' motivation, as they indicated that the struggling writers in their classrooms who received such instruction evidenced more effort and intrinsic motivation for writing than did the children in the control condition (both effect sizes were large, exceeding 1.06). Finally, individual interviews with teachers showed that they viewed planning strategy instruction, as represented by the SRSD plus peer support package, as both effective and acceptable for classroom application. These findings are consistent with the outcome of other SRSD studies where classroom-based strategy instruction in planning had a powerful impact on students' writing (see, e.g., Danoff et al., 1993; De La Paz, 1999, 2001; De La Paz & Graham, 2002).

Lessons Learned

Theoretical Implications

We and others have argued that difficulties with text transcription skills such as handwriting or spelling may constrain young children's writing development (Berninger, 1999; Graham, 1999; McCutchen, 1988). Our work with CASL provided support for this proposition, as we found that handwriting and spelling instruction not only resulted in improvements in each of these skills for children who were experiencing difficulty mastering them but also enhanced their sentence construction skills and writing output (Graham et al., 2000; Graham, Harris, & Fink-Chorzempa, 2002). These findings confirm and extend previous research showing that handwriting and spelling instruction can have a positive impact on the output and quality of young children's writing (Berninger et al., 1997; Berninger et al., 1998; Jones & Christensen, 1999). Additional research is needed to more fully explore the link between writing development and handwriting and spelling, as difficulty mastering these skills may be one precursor to writing disabilities.

One way that listed text transcription skills may constrain writing development is that they require so much mental effort for young children that they minimize the use of other writing processes, such as planning, which exert considerable processing demands as well (McCutchen, 1988). This may make it difficult for young children to integrate new attention-demanding skills and strategies into their approach to writing, as such bootstrapping places additional demands on processing capabilities as well. The four CASL planning strategy studies (Graham et al., in press; Harris, Graham, & Adkins, 2004; Harris, Graham, & Mason, 2004; Saddler et al., 2004) demonstrated that young children, even struggling writers, can be taught to use new attention-demanding tools, such as planning strategies, when they write, at least when instruction is explicit and systematic, providing them with needed assistance or scaffolding until they can use these tools effectively and independently. In addition, these four studies provided evidence that planning plays an important role in writing development, as instruction in how to plan consistently led to improvements in writing performance. Whereas similar effects have been found with older students (Graham & Harris, 2000, 2003), these studies show that even for very young children, planning is an important element in learning to write effectively.

Practical Implications

The CASL writing studies provided confirmation for our assumption that children in urban schools serving a high percentage of children from low-income families can succeed at writing when they are provided with explicit and systematic instruction. In each instructional study that we conducted, young struggling writers from such schools made impressive gains in their writing. These gains were made by students with and without special needs. It must be noted, however, that not every single student was a treatment responder. For example, two spelling-instructed students in the study by Graham, Harris, and Fink-Chorzempa (2002) did not make greater improvement than their peers in the math control condition on any of the three norm-referenced spelling measures that were administered. This occurred even though instruction was very intense, involving one instructor for every two students. Additional research is needed to identify effective alternatives for such students.

Another implication from our work is that it is important to address multiple aspects of competence when teaching young struggling writers how to compose. This was evident in the writing survey study (Graham et al., 2003), in which primary-grade teachers indicated that they taught a variety of writing skills and processes. Furthermore, addressing multiple aspects of competence may have benefits beyond the skills and strategies targeted for instruction. For instance, we found that teaching handwriting and spelling influenced the development of two other important writing processes: content generation and sentence construction (Graham et al., 2000; Graham, Harris, & Fink-Chorzempa, 2002). Likewise, planning-strategy instruction enhanced students' knowledge of writing, students' motivation for writing, and the quality of students' writing across genres (Graham et al., in press; Harris, Graham, & Adkins, 2004; Harris, Graham, & Mason, 2004; Saddler et al., 2004). The strong and robust findings from the planning-strategy studies suggest that primary-grade teachers

should place more emphasis on such instruction in their classrooms. In the writing survey study (Graham et al., 2003), primary-grade teachers devoted much less time to teaching planning than they did to other aspects of writing. We are not recommending, however, that primary-grade teachers should reduce the amount of time they spend teaching transcription skills, as we found that providing extra handwriting and spelling instruction was beneficial for young struggling writers.

Finally, based on findings from the writing survey study (Graham et al., 2003), we cannot assume that primary-grade teachers will adapt their instruction to meet the needs of the struggling writers in their classes. Three out of every four reported adaptations were made by a small proportion of teachers (29%), and 40% of teachers made no or only one or two adaptations. Consequently, we must identify powerful instructional techniques for teaching writing that are effective with good, average, and struggling writers (such as SRSD; see Graham & Harris, 2003, for a summary of effect sizes with different types of writers). Our research and that of others (see, e.g., Wong, 1994) further reinforces the need to develop instructional programs designed to promote maintenance and generalization. We found that this can be facilitated, at least in part, by having peers work together to support their use of what they have learned (Graham et al., in press; Harris, Graham, & Mason, 2004). Additional research is needed, however, to explore how maintenance and transfer normally develop and how both can be enhanced.

AUTHORS' NOTES

REFERENCES

Adams, M. (1990). *Beginning to read: Thinking and learning about print.* Cambridge, MA: MIT Press.

Alexander, P. (1997). Mapping the multidimensional nature of domain learning: The interplay of cognitive, motivational, and strategic forces. In M. Maehr & P. Pintrich (Eds.), *Advances in motivation and achievement* (Vol. 10, pp. 213–250). Greenwich, CT: JAI Press.

Alexander, P., Graham, S., & Harris, K. R. (1996). A perspective on strategy research: Progress and prospects. *Educational Psychology Review, 10,* 129–154.

Berninger, V. (1999). Coordinating transcription and text generation in working memory during composing: Automatic and constructive processes. *Learning Disability Quarterly, 22,* 99–112.

Berninger, V., Vaughn, K., Abbott, R., Abbott, S., Rogan, L., Brooks, A., et al. Treatment of handwriting problems in beginning writers: Transfer from handwriting to composition. *Journal of Educational Psychology, 89,* 652–666.

Berninger, V., Vaughn, K., Abbott, R., Brooks, A., Abbott, S., Rogan, L., et al. (1998). Early intervention for spelling problems: Teaching functional spelling units of varying size with a multiple-connections framework. *Journal of Educational Psychology, 90,* 587–605.

Bridge, C., Compton-Hall, C., & Cantrell, S. (1997). Classroom writing practices revisited: The effects of statewide reform on writing instruction. *Elementary School Journal, 98,* 151–170.

Bridge, C., & Hiebert, E. (1985). A comparison of classroom writing practices, teacher's perceptions of their writing instruction, and textbook recommendations on writing practices. *Elementary School Journal, 86,* 155–172.

Cameron, C., Hunt, A., & Linton, M. (1996). Written expression as reconceptualization: Children write in social time. *Educational Psychology Review, 8,* 125–150.

Danoff, B., Harris, K. R., & Graham, S. (1993). Incorporating strategy instruction within the writing process in the regular classroom: Effects on the writing of students with and without learning disabilities. *Journal of Reading Behavior, 25,* 295–322.

DeFord, D. (1985). Validating the construct of theoretical orientation in reading. *Reading Research Quarterly, 20,* 351–367.

De La Paz, S. (1999). Self-regulated strategy instruction in regular education settings: Improving outcomes for students with and without learning disabilities. *Learning Disabilities Research & Practice, 14,* 92–106.

De La Paz, S. (2001). Teaching writing to students with attention deficit disorders and specific language impairments. *Journal of Educational Research, 95,* 37–47.

De La Paz, S., & Graham, S. (2002). Explicitly teaching strategies, skills, and knowledge: Writing instruction in middle school classrooms. Journal of Educational Psychology, 94, 687–698.

Diaper, D. (1989). *Knowledge elicitation: Principles, techniques, and application.* New York: Wiley.

Ehri, L. (1989). The development of spelling knowledge and its role in reading acquisition and reading disabilities. *Journal of Learning Disabilities, 22,* 356–365.

Englert, C., Garmon, A., Mariage, T., Rozendal, M., Tarrant, K., & Urba, J. (1995). The early literacy project: Connecting across the literacy curriculum. *Learning Disability Quarterly, 18,* 253–275.

Fuchs, D., Fuchs, L., Mathes, P., & Simmons, D. (1997). Peer-assisted learning strategies: Making classrooms more responsive to diversity. *American Educational Research Journal, 34,* 174–206.

Fuchs, L., Fuchs, D., Prentice, K., Burch, M., Hamlett, C., Owen, R., et al. (2003). Explicitly teaching for transfer: Effects on third-grade students' mathematical problem solving. *Journal of Educational Psychology, 95,* 293–305.

Gilliam, R., & Johnston, J. (1992). Spoken and written language relationships in language/learning-impaired and normally achieving school-age children. *Journal of Speech and Hearing Research, 35,* 1303–1315.

Gould, J. (1980). Experiments on composing letters: Some facts, some myths, and some observations. In L. Gregg & E. Steinberg (Eds.), *Cognitive processes in writing* (pp. 97–127). Hillsdale, NJ: Erlbaum.

Graham, S. (1990). The role of text production factors in learning disabled students' compositions. *Journal of Educational Psychology, 82,* 781–791.

Graham, S. (1999). Handwriting and spelling instruction for students with learning disabilities: A review. *Learning Disability Quarterly, 22,* 78–98.

Graham, S., Berninger, V., Abbott, B., Abbott, S., & Whitaker, D. (1997). Role of mechanics in composing of elementary school students: A new methodological approach. *Journal of Educational Psychology, 89,* 170–182.

Graham, S., & Harris, K. R. (2000). The role of self-regulation and transcription skills in writing and writing development. *Educational Psychologist, 35,* 3–12.

Graham, S., & Harris, K. R. (2002). Prevention and intervention for struggling writers. In M. Shinn, H. Walker, & G. Stone (Eds.), *Interventions for academic and behavior problems II: Preventive and remedial approaches.* Bethesda, MD: NASP.

Graham, S., & Harris, K.R. (2003). Students with learning disabilities and

the process of writing: A meta-analysis of SRSD studies. In L. Swanson, K. Harris, & S. Graham (Eds), *Handbook of learning disabilities* (pp. 383–402). New York: Guilford Press.

Graham, S., & Harris, K.R. (2004). Writing instruction. In B. Wong (Ed.), *Learning about learning disabilities* (3rd ed., pp. 281–313). San Diego, CA: Elsevier Science.

Graham, S., Harris, K. R., & Fink-Chorzempa, B. (2000). Is handwriting causally related to learning to write: Treatment of handwriting problems in beginning writers. *Journal of Educational Psychology, 92,* 620–633.

Graham, S., Harris, K. R., & Fink-Chorzempa, B. (2002). Contributions of spelling instruction to the spelling, writing, and reading of poor spellers. *Journal of Educational Psychology, 94,* 669–686.

Graham, S., Harris, K. R., Fink-Chorzempa, B., & MacArthur, C. (2001). Teacher efficacy in writing: A construct validation with primary grade teachers. *Scientific Study of Reading, 5,* 177–202.

Graham, S., Harris, K. R., Fink-Chorzempa, B., & MacArthur, C. (2002). Primary grade teachers' theoretical orientations concerning writing instruction: Construct validation and a nationwide survey. *Contemporary Educational Psychology, 27,* 147–166.

Graham, S., Harris, K. R., Fink-Chorzempa, B., Saddler, B., Moran, S., Adkins, M., & Mason, L. (2004). *A national survey of the handwriting practices of primary grade teachers.* Unpublished raw data.

Graham, S., Harris, K. R., MacArthur, C., & Fink-Chorzempa, B. (2003). Primary grade teachers' instructional adaptations for weaker writers: A national survey. *Journal of Educational Psychology, 95,* 279–293.

Graham, S., Harris, K. R., & Mason, L. (in press). *Improving the writing performance, knowledge, and self-efficacy of struggling young writers: The effects of self-regulated strategy development.* Contemporary Educational Psychology.

Graham, S., Harris, K. R., Mason, L., Moran, S., Saddler, B., & Adkins, M. (2004). *A national survey of the spelling practices of primary grade teachers.* Unpublished raw data.

Graham, S., Harris, K. R., & Troia, G. (1998). Writing and self-regulation: Cases from the self-regulated strategy development model. In D. Schunk & B. Zimmerman (Eds.), *Self-regulated learning: From teaching to self-reflective practice.* New York: Guilford Press.

Greenwald, E., Persky, H., Campbell, J., & Mazzeo, J. (1999). *National assessment of educational progress: 1998 Report card for the nation and the states.* Washington, DC: U.S. Department of Education.

Hammill, D., & Larsen, S. (1996). *Test of Written Language–Third Edition.* Austin, TX: PRO-ED.

Harris, K. R., & Graham, S. (1996). *Making the writing process work: Strategies for composition and self-regulation.* Cambridge, MA: Brookline Books.

Harris, K. R., Graham, S., & Adkins, M. (2004). *The effects of teacher-led SRSD instruction on the writing and motivation of young struggling writers.* Manuscript under preparation.

Harris, K.R., Graham, S., & Mason, L. (2003). Self-regulated strategy development in the classroom: Part of a balanced approach to writing instruction for students with disabilities. *Focus on Exceptional Children, 35,* 1–16.

Harris, K. R., Graham, S., & Mason, L. (2004). *Improving the writing performance, knowledge, and motivation of struggling writers in second grade: The effects of self-regulated strategy development.* Manuscript submitted for publication.

Jones, D., & Christensen, C. (1999). The relationship between automaticity in handwriting and students' ability to generate written text. *Journal of Educational Psychology, 91,* 44–49.

Kellogg, R. (1987). Effects of topic knowledge on the allocation of processing time and cognitive effort to writing processes. *Memory & Cognition, 15,* 256–266.

MacArthur, C., & Graham, S. (1987). Learning disabled students' composing with three methods: Handwriting, dictation, and word processing. *Journal of Special Education, 21,* 22–42.

McCutchen, D. (1988). "Functional automaticity" in children's writing: A problem of metacognitive control. *Written Communication, 5,* 306–324.

Meyer, M., & Booker, J. (1991). *Eliciting and analyzing expert judgement: A practical tour. London:* Academic Press.

National Commission on Writing. (2003). *The neglected "R."* College Entrance Examination Board.

Nelson, R., Benner, G., Lane, K., & Smith, B. (2004). An investigation of the academic achievement of K–12 students with emotional and behavioral disorders in public school settings. *Exceptional Children, 71,* 59–74.

Newcomer, P. L., & Barenbaum, E. M. (1991). The written composing ability of children with learning disabilities: A review of the literature from 1980 to 1990. *Journal of Learning Disabilities, 24, 578–593.*

No Child Left Behind Act of 2001, Pub. L. No. 107-110, Stat. 1425 (2002).

Persky, H., Daane, M., & Jin, Y. (2003). *The nation's report card: Writing. Washington,* DC: U.S. Department of Education.

Pintrich, P., & Schunk, D. (1996). *Motivation in education.* Englewood Cliffs, NJ: Prentice Hall.

Pritchard, R. (1987). Effects on student writing of teacher training in the National Writing Project model. *Written Communication, 4,* 51–67.

Resta, S., & Eliot, J. (1994). Written expression in boys with attention deficit disorders. *Perceptual and Motor Skills, 79,* 1131–1138.

Saddler, B., Moran, S., Graham, S., & Harris, K. R. (2004). Preventing writing difficulties: The effects of planning strategy instruction on the writing performance of struggling writers. *Exceptionality, 12,* 13–17.

Salomon, G., & Globerson, T. (1987). Skill may not be enough: The role of mindfulness in learning and transfer. *International Journal of Educational Research, 11,* 623–637.

Scardamalia, M., & Bereiter, C. (1986). Written composition. In M. Wittrock (Ed.), *Handbook of research on teaching* (3rd ed., pp. 778–803). New York: MacMillan.

Sexton, M., Harris, K.R., & Graham, S. (1998). Self-regulated strategy development and the writing process: Effects on essay writing and attributions. *Exceptional Children, 65,* 235–252.

Wechsler, D. (1992). *Wechsler Individual Achievement Test.* San Antonio, TX: Psychological Corp.

Wong, B. (1994). Instructional parameters promoting transfer of learned strategies in students with learning disabilities. *Learning Disability Quarterly, 17,* 100–119.

Wong, B., Harris, K. R., Graham, S., & Butler, D. (2003). Cognitive strategy instruction research in learning disabilities. In L. Swanson, K. Harris, & S. Graham (Eds), *Handbook of learning disabilities* (pp. 323–344). New York: Guilford Press.