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Abstract

Experimental research on strategy instruction for beginning writers has only recently begun. This study investigated the role of self-regulation instruction in Grade 1 strategy learning. In a pretest-post-test quasi-experiment, 120 Grade 1 students participated in a unit of study on personal narrative in one of three conditions: 1) Self-Regulated Strategy Development (SRSD; Harris & Graham, 2009), which included instruction in goal-setting, strategy steps, coping, self-monitoring, and self-reinforcement; 2) strategy instruction only (SO), which focused on the goal and steps of the strategy; 3) a control condition. Students in both strategy conditions, relative to the control, made large, statistically significant gains in text quality, word count, story features, and self-regulation knowledge. The SRSD condition resulted in greater self-regulation knowledge than the SO condition, which resulted in greater knowledge than the control. Pretest text quality did not interact significantly with condition. The effect of instruction on text quality was largely mediated by post-test self-regulation knowledge.

Keywords: Writing instruction; strategy instruction; First grade; self-regulated strategy development; self-regulated learning.

Word count, including abstract, figures and tables: 13,852

The first year of formal writing instruction in many countries, often called First Grade or Grade 1, occurs when students are six years of age. Most students who write well in Grade 1 continue to write well throughout the elementary grades, although the level of continuity is not as great as that for reading (Abbott, Berninger & Fayol, 2010; Juel, 1988; Kim, Petsher, Wanzek & Al Otaiba, 2018). The role of early success points to the importance of effective initial writing instruction. However, very little experimental research has focused on writing instruction in Grade 1. A recent review showed that most experimental research on composition has taken place in Grades 3 through 8 (Graham, Harris & Chambers, 2016). Most experimental writing research in Grade 1 has focused on transcription (handwriting and spelling). A few studies have focused on multi-component interventions that combine instruction in composition with instruction in transcription, but most of these have not isolated the effects of composition instruction itself as an independent variable (Graham et al., 2016; McMaster, Kunkel, Shin, Jung, & Lembke, 2018).

Strategy instruction teaches students a process for guiding their own writing. It typically addresses two key components of writing development: discourse knowledge and self-regulation (Berninger & Chanquoy, 2012; Kim, 2020; Kim & Schatschneider, 2017; Olinghouse & Graham, 2009; Olinghouse, Graham & Gillespie, 2015). Strategy instruction frequently focuses on a genre of text, such as narrative or persuasive writing, and on the writing processes of planning, drafting, and/or revising. In a recent meta-analysis of experimental research on writing instruction, strategy instruction produced the largest and most consistent effects on text quality (Graham, McKeown, Kihara, & Harris, 2012; Graham et al., 2016).

The method of strategy instruction that has been most heavily researched is Self-Regulated Strategy Development (Graham et al., 2016; Harris & Graham, 2009). In SRSD, students are

taught a strategy through a six-phase process: Develop background knowledge, Discuss It, Model it, Memorize it, Support it, and Independent writing. SRSD instruction teaches several processes of self-regulation, including goal setting, self-instruction, self-monitoring, self-evaluation, and self-reinforcement (Graham, Harris, MacArthur & Santangelo, 2018; Reid, Lienemann & Hagaman, 2013; Santangelo, Harris & Graham, 2016).

Meta-analyses of experimental and quasi-experimental studies have shown that SRSD has produced reliable, large effect sizes with students in Grade 2 and later elementary grades (Graham et al., 2012), as well as students in secondary and college education (Hoover, Kubina & Mason, 2012; MacArthur, Philippakos & Ianetta, 2015). It has been used to teach several genres of text, including narrative, persuasive, and informational writing (Graham et al., 2012; Hebert, Bazis, Bohaty, Roehling & Nelson, 2021). SRSD has been used effectively with students who are typically developing and achieving, as well as students with several kinds of exceptionalities, including learning disabilities, emotional and behavioral disorders, and autism spectrum disorders (Asaro-Saddler, Moeyaert, Xu, & Yerden, 2020; Gillespie & Graham, 2014, Reid, Hagaman & Graham, 2014).

The success of strategy instruction raises the question, is this method effective for beginning writers? On one hand, for elementary students, discourse knowledge is a contributor to individual differences in writing (Kim & Schatschneider 2017; Kim, 2020). This suggests that young writers would be capable of learning strategies for generating such discourse. On the other hand, for young children, transcription accounts for much of the variance in the quantity and quality of their texts (Juel, 1988; Kim & Schatschneider 2017). This raises the possibility that young students' limited transcription skills could constrain their ability to learn and apply writing

strategies. In any case, strategy instruction has been widely recommended for Grade 1 (e.g., Coker & Ritchey, 2015; Philippakos & MacArthur, 2019).

Results concerning SRSD for Grade 1 students are promising. In the first study of strategy instruction in First Grade, Zumbrunn and Bruning (2013) used a multiple baseline design to investigate the effect of SRSD instruction on six students, with positive effects on text quality, length and story components. Recently, Arrimada, Torrance and Fidalgo (2019) conducted a quasi-experiment using Cognitive Self-regulation Instruction to teach six classes of students a strategy for narrative writing. Instruction included the use of a graphic representation of the strategy as a “Story Mountain,” a route with six steps of a strategy, organized into three villages comprising the beginning, middle and end of the story. Relative to a control group that participated in the regular curriculum, students who participated in Cognitive Self-Regulation Instruction made statistically significant, large gains in text quality. Recently, Traga Philippakos (2019) conducted a randomized experiment on the effects of using SRSD to teach procedural writing in Grade 1. Students received instruction either from a teacher trained in SRSD or from a teacher who taught the same genre without SRSD training. Students taught by SRSD trained teachers made significantly greater gains in text quality, and teachers rated the social acceptability of SRSD highly. These initial results support the effectiveness of strategy instruction in Grade 1.

An issue that requires further investigation is the role played by self-regulation in strategy instruction. De La Paz (2007) argued that SRSD requires additional time relative to other approaches to writing instruction, so it is helpful to know which components contribute to its effects. Recently Santangelo et al. (2016) reviewed previous research on self-regulation instruction in writing. They concluded that there is strong evidence for the effect of teaching

five components of self-regulation: using models, tutors or books; self-evaluative standards; goal setting; mental imagery; and cognitive strategy instruction (including both pre-writing strategies, and adding self-regulation to strategy instruction). However, they also concluded that research on this topic is incomplete and called for investigation of several issues, including the effect of self-regulation instruction across grade levels.

Several studies have tested the self-regulatory component of strategy instruction using componential research. This type of research compares strategy instruction that includes extensive self-regulation instruction (e.g., additional focus on goal setting, self-monitoring, self-evaluation, and self-reinforcement), versus strategy instruction that includes limited self-regulation instruction (i.e., a focus on the steps of the strategy). Some studies have found positive effects for adding self-regulation instruction to strategy instruction (Brunstein & Glaser, 2011; Glaser & Brunstein, 2007; Kurtz, 1987). However, other studies have found mixed effects (Sawyer, Graham & Harris, 1992), or non-significant effects (Graham & Harris, 1989). Moreover, no componential studies of self-regulation instruction in writing have previously been conducted with beginning writers.

The issue of self-regulation instruction in Grade 1 is of particular interest because for young children, both transcription and self-regulatory processes are in the process of development, and highly variable across individuals (Montroy, Bowles, Skibbe, McClelland & Morrison, 2016; Roebbers, 2017). Recently, writing researchers have adapted strategy instruction to Grade 1 students in several ways: Supporting handwriting and spelling; oral rehearsal of strategies and story content; the use of children's literature; and the use of puppets to elicit metacognitive talk (Arrimada et al, 2019; Traga Philippakos, MacArthur & Munsell, 2018; Traga Philippakos, Munsell & Robinson, 2019).

The present study investigated the effect of self-regulation instruction in teaching a strategy for writing personal narratives, which we called, “Our Stories.” Grade 1 writing frequently takes the form of personal narrative, which may be referred to as “journal writing” or “recount” (e.g., Derewianka, 1991). The purpose of a personal narrative is to share an experience that is important to the writer. This genre is important because young children frequently make sense of their personal experiences by telling stories about them (Nelson, 2003). Personal narrative writing in Grade 1 is illustrated by popular writing topics such as a class trip, a visit from a relative, a family celebration, or the birth of a sibling. Personal narratives differ from other narratives in that they are presented as true, while other narratives may be presented as fictional. Personal narratives may also differ from narratives that follow an arc in which a protagonist pursues the solution to a problem, with elements such as an initiating event, a response from the protagonist, an attempted solution, a complication, and an eventual solution. This arc has become the basis for much instruction and assessment of children’s narrative (e.g., Petersen & Spencer, 2012). However, as Alison (2019) has recently documented, narratives in literature follow a variety of structures different from the traditional problem-driven arc, including structures that meander, spiral, or branch.

The present study was a pretest-post-test quasi-experiment with three conditions: Self-Regulated Strategy Development, comprised of strategy instruction with elaborated self-regulation instruction including goal-setting, self-instruction in strategy steps, self-monitoring, self-reinforcement, and coping; Strategy instruction Only (SO) comprised of learning about personal narrative text and strategy steps; and a control that participated in the regular curriculum. Students completed personal narrative writing samples at pre- and post-test, which were scored on three measures (holistic text quality; word count; story features). Additionally, at

post-test, students completed an interview that assessed their declarative knowledge about self-regulation in writing.

Research questions and hypotheses were the following:

Q1: Does SRSD affect self-regulation knowledge about writing?

H1: SRSD would result in greater self-regulation knowledge than SO, which would result in greater self-regulation knowledge than the control condition.

Q2: Does strategy instruction affect the text quality of Grade 1 writers?

H2: The two strategy instruction conditions (SRSD, SO) would result in significant gains in text quality (holistic quality, word count, story features) relative to the control condition.

Q3: Does the self-regulatory component of SRSD affect the text quality of Grade 1 writers?

H3: SRSD, compared to SO, would result in significantly greater gains in text quality (holistic quality, word count, story features).

Q4: Would SRSD and SO instruction interact with pretest text quality, such that the effects of strategy instruction would differ among writers with low, medium and high pretest writing scores?

H4: There was not a specific hypothesis concerning this question.

Q5: Would the effect of strategy instruction on writing be mediated by self-regulatory knowledge?

H5: In a mediational analysis, the effect of SRSD and SO instruction on text quality, if any, would be accounted for by self-regulatory knowledge.

Procedure

Context

In Canada, education is governed at the level of the province. Curriculum expectations for Grade 1 in the province in which this study was conducted require that students learn to do the following: Organize ideas to write for an intended purpose and audience; draft and revise their writing; use editing strategies to present their work effectively; and reflect on themselves and their strategies to identify strategies that are most helpful (Ministry of Education, 2006). Students are expected to learn “forms” of writing (genre), such as recounts, reports, procedural writing, stories, poems, and posters.

This study took place in a middle-sized city and nearby small town. Ethical review was obtained from the researchers’ university and a local board of education. An invitation to participate was distributed to Grade 1 teachers and school principals throughout the board; teachers who were interested emailed the Principal Investigator for additional information. If a teacher consented to participate, and the principal also approved the project to take place in the school, it was implemented. If a child provided assent, and the child’s parent provided consent, they were included in the interviews and their data was used in the study.

Nine teachers in five schools consented to participate. Where more than one teacher in a school consented to participate, the classes were randomly assigned to different conditions. Three classes were located in two schools that served low income neighborhoods in a city. Three classes were located in one school in a small town and served students from a range of income levels. Three classes were located in two schools that served middle income schools in a city. The teachers included 8 women and 1 man.

Participants

Of the 122 students who consented, 120 completed the study; the two remaining students had prolonged absences from school, for a completion rate of 98.36%. Overall, the mean age of

participants at the beginning of instruction was 6 years, 4.83 months, $SD = 3.43$ months. English was spoken as a second language by 11.70% of students. Gender was 44.2% female and 55.8% male. In the participating schools, the mean percentage of students who had passed a provincial writing test that measured organization, ideas, content, and conventions, was 75.49, $SD = 8.67$. Table 1 provides a comparison of participant characteristics by condition. The three conditions did not differ significantly with respect to any of the characteristics just described.

Instruction

Instruction will be detailed here for the SRSD group; then variations will be described for the other two conditions.

Self-Regulated Strategy Development

SRSD instruction comprised the six phases outlined above; these were taught in an overlapping way. SRSD instruction was supported by a Teacher's Guide that outlined 10 lessons. Each lesson included the following sections, similar to those used in previous SRSD resources (Harris, Graham, Mason & Friedlander, 2008): *Set the Context for Student Learning* was comprised of reviewing the previous lesson and introducing the topic of the day; *Read Aloud* focused on a picture book that presented an aspect of self-regulation or a theme for subsequent student writing; *Develop the Strategy and Self-Regulation* was the main body of the lesson, comprised of discussion, modelling and shared writing; *Student Activity* included creating an oral or written narrative; and *Wrap-Up* including closing activities such as students sharing their writing and giving one another feedback, and sometimes a "homework" activity. Teaching materials included examples of teacher scripts and personal narrative texts. However, teachers were encouraged to consider them as illustrative and to create their own wording for lessons and example texts. Each lesson was designed to require approximately 40 minutes, but could be

divided into several brief sessions, such as reading aloud in one session, writing a story in another session, and students sharing their stories in a third session. The following paragraphs outline the main emphases in each of the 10 lessons.

Develop Background Knowledge. The purpose of Lesson 1 was to orient students to the personal narrative genre. The teacher began by reading aloud *Ralph Tells a Story* (Hanlon, 2012), a story about a young boy who initially has difficulty thinking of what to write about in his journal. With the help of his friends and teacher, he learns that “we all have stories.” The class discussed their own stories, with whom they share them, where, and when. Volunteers drew topics from the Terrific Topics Top Hat, a prop with a collection of 25 personal narrative topics on small cards, and told a brief personal story about the topic. Students drew pictures of themselves, showing when, where, and with whom they shared their stories.

Lesson 2 continued to develop background knowledge, this time focusing on the parts of a personal narrative. The teacher and class read a chart story, and the class collaboratively sequenced pictures representing its parts. The teacher introduced terms for these parts: Topic, setting, beginning, middle, end, and feeling, using a large chart. Icons were used to assist beginning readers in decoding these terms. In workbooks, students cut and glued a sequence of pictures illustrating a story and attached icons to label each part of the story.

Discuss it, Model it. In Lesson 3, students reviewed the previous lesson by listening to the teacher read aloud *The Snowy Day* (Keats, 1962) and identifying the parts of the story. The teacher introduced the concept of *strategy* as “a trick for helping us write good stories.” Using a chart, the teacher presented each step of the strategy, placing an icon next to the corresponding event in the story (see Figure 1). The teacher modelled writing a personal narrative while thinking aloud. The think-aloud included setting a goal, which was “writing a story that is fun to

write, and that readers like to read.” The think-aloud focused on using the steps of the strategy to create the story. The teacher handed out strategy bookmarks, similar to the chart introduced earlier (see Figure 1) with keywords for each step of the strategy, and an icon to support decoding. Each student thought of a time that they had done something fun, then turned to an elbow partner and orally told a story about it, using the bookmark as a reminder of the steps of the strategy. To support transfer, students planned to tell a story to someone at home.

Support it, Memorize it. In Lesson 4, the teacher read aloud *The Relatives Came* (Rylant, 1993) to provide a theme for writing. The teacher discussed reasons for memorizing the strategy and introduced a rhyme with gestures to help students remember the steps of the strategy (see Figure 1).

The teacher modelled writing a personal narrative about a fall day. First, the teacher engaged them with the events by leading them in acting out the activities of the day—imagining the warm sun, the bright colours of the trees and the crisp air on their faces; raking the leaves; making a big pile; and then walking through the pile and crunching the leaves. The teacher then wrote the story on chart paper, as students raised their hands and prompted the teacher to use the steps of the strategy. Then the students wrote a story with a partner about a time that a relative had visited. In each pair of partners, one wore a name tag designating them the “Story Writer” and drafted the text; the other student took the role of “Coach” and helped the writer remember and apply the steps of the strategy. For each topic in the unit, if a student did not have an experience relevant to the topic of the day, (e.g., a relative visiting), they could draw a topic from the Terrific Topics Top Hat. After writing, volunteers shared their stories on a SmartBoard or overhead projector, and the teacher asked their peers to identify where the writer had used the steps of the strategy.

Model it, Support it: Goal-setting and Self-Monitoring. Lesson 5 returned to teacher modelling, this time with a focus on goal-setting and self-monitoring. To support goal setting, in small groups, the teacher returned a copy of each child's pretest writing sample, marked up with icons to label the parts of the story. The teacher had attached a checklist of story parts, with the parts that the student completed checked off. The teacher and students discussed the parts of the story that were present (in most instances, one or two events), and the parts that were missing (in most instances, the setting, ending, and feeling). The teacher set goals with each student about what features they could learn to include in their story. In a subsequent large group session, the teacher then modelled on a chart how to review a piece of writing, sticking icons on the text to represent each part of the story (and corresponding step of the strategy) that had been completed, then invited students to take the lead and continue reviewing it. For parts of the story that were missing, the teacher and students added text. Then, students individually wrote a story about a time that a relative had visited. After the students were finished, the teacher guided them through checking their stories. Students used stick-on icons, locating story parts in their text and attaching the corresponding icon next to them. Student volunteers shared their goals for writing, shared their story on a screen (e.g., a Smartboard), and identified the parts that they had included and those that they needed to add.

Model it, Support it: Self-Reinforcement. In Lesson 6, the teacher returned to the Model It and Support It phases. This time the lesson focused on self-reinforcement, which the teacher explained as "praise." The teacher introduced students to praising themselves for three things: Using the strategy, persistent effort, and qualities of their story. The students brainstormed phrases they could use to praise themselves, and the teacher recorded these phrases on green Giant Thought Bubbles, with small illustrations to help students decode these phrases. The

teacher and a puppet role played creating a story, and students raised their hands to praise the puppet for appropriate behaviors, using the thought bubbles as reminders. Students then wrote individual stories using a workbook page with small thought bubbles for support. They then shared their stories, as well as sharing three examples of praising themselves.

Model it, Support it: Coping. Lesson 7 cycled again through Model It and Support it, this time focusing on the use of self-statements to support coping with writing difficulties. Coping was selected for attention because it was anticipated that Grade 1 students, particularly struggling writers, would find it challenging to generate content and transcribe text. Students again listened to *Ralph Tells a Story* (Hanlon, 2012), this time focusing on the problems that Ralph had in writing, and the way in which he coped with them. The class brainstormed problems that they experienced during writing. Previous experience with Grade 1 students suggested that these difficulties may include struggling to think of what to write, spelling words, and being tired or bored, so these were included as examples in the *Teachers' Guide*. Students brainstormed solutions and the teacher jotted these on yellow Giant Thought Bubbles, with icons to help students decode the phrases. Solutions included “Use our strategy,” “First letter and line” [for spelling] and “Take my time.” The teacher posted the Giant Thought Bubbles on the wall. Finally, the teacher wrote a story while thinking aloud and role played experiencing these problems, and the students coached the teacher to cope with them.

Support it: Putting it All Together. In Lesson 8 the teacher and students reviewed self-monitoring, coping, and self-reinforcement. The teacher divided the class into three groups: Strategy experts, who prompted drafting and checking strategy steps; praise experts who provided reinforcement; and coping experts who suggested solutions to problems. Each group had small thought bubbles or bookmarks to support them. The teacher modelled drafting a story

and role-played various difficulties; students raised their bubbles/bookmarks and guided the teacher to solve them. Students then wrote individual stories. They shared their stories with a partner, and gave an example of each of checking, praising, and coping.

Independent Writing. In Lesson 9, the teacher read aloud *The Roller Coaster* (Frazee, 2006). Students discussed the theme of the story, then wrote a story about a time that they had done something exciting. The teacher assisted students with editing. In Lesson 10, students created a good copy of their text and added a picture. Each class published it in a form to share with classmates, such as a class book.

Strategy Only Condition

Students in the SO condition received instruction that was identical to the SRSD condition with respect to understanding the genre of personal narrative, and the goal and steps of the strategy. Lessons 1 through 4 were identical for the SO and SRSD conditions; they focused on developing background knowledge about the personal narrative genre; discussing the strategy; observing the teacher model strategy while thinking aloud; and creating personal narratives orally and in writing. Lessons 5 through 8 differed from the SRSD condition: Students in the SO condition did not experience lessons on goal setting, self-monitoring, self-reinforcement, or coping. Rather, they continued to practice the strategy through oral rehearsal and writing, and the teacher provided feedback to the students on their use of the strategy and their writing. Students in the SO group listened to the teacher read the same picture books and wrote stories on the same topics as those that the SRSD group wrote about. Lessons 9 and 10, Independent writing, were identical to those in the SRSD condition with students completing a text individually and editing it for publication with support from the teacher.

Control Condition

Students in the control condition participated in the regular curriculum. As noted above, the curriculum for this province emphasizes the writing process, teaching text genre, teaching writing strategies, and reflecting on strategies. Personal narrative is a frequently assigned genre of writing in the form of “journal” stories. Common practices in local schools emphasize the writing processes of planning, drafting, and revising various types of texts with support from the teacher. Students complete texts using a strategy provided by the teacher, often with support from anchor charts posted in the classroom or graphic organizers for each student. Teachers frequently use a gradual release of responsibility approach that progresses from shared writing to individual writing. Students plan and revise texts with assistance from the teacher. Students use the steps of strategy to complete a text. However, the experience of the research team is that relative to SRSD, there is typically less emphasis on developing background knowledge about the genre, goal setting, memorizing the strategy, self-monitoring, self-reinforcement, and coping. Think-aloud modeling is not a common teaching activity.

Professional Development

Teacher education was based on Practice Based Professional Development (PBPD; Ball & Cohen, 1999), which has also been used in other recent studies of SRSD (e.g., Harris, Graham & Adkins, 2015). The current study implemented several elements of PBPD: It focused on pedagogical content knowledge; it addressed the needs of teachers’ current students; teachers saw the practices modelled; they used resources and teaching materials during PD that they would later use during teaching; they practiced SRSD with peers and received feedback; and they received follow-up support during actual classroom teaching.

The first session of professional development focused on teaching the genre of personal narrative and on strategy instruction. It included the teachers who would subsequently implement

the SRSD and SO conditions. Strategy instruction was presented with a progression that included the following elements: Developing background knowledge about the genre of personal narrative; discussing the strategy for personal narrative writing; the PI modeling the teaching of the strategy while thinking aloud, with teachers taking the role of students in a lesson; and teachers preparing and modelling brief lesson segments, with a focus on the think-aloud modelling phase and receiving feedback from colleagues. Additionally, this session presented other underlying concepts of SRSD, including individualization, mastery learning, and graduate release of responsibility.

The first session also familiarized the teachers with the Teacher's Guide and the content of the supporting kits of picture books and concrete materials. Script-like examples of teacher dialogue were provided, particularly to illustrate think aloud modelling, but teachers were encouraged not to repeat them word for word, and instead to teach SRSD in their own words. The Teacher's Guide included examples of personal narrative text stories, but teachers were encouraged to create their own narratives when modelling strategies or leading supported writing.

The second professional development session was attended by teachers who were to implement the full SRSD condition, but not teachers who would implement the SO condition. It focused on instruction in self-regulation beyond building knowledge about the personal narrative genre and the steps of the strategy. This included instruction in goal setting, self-monitoring, coping, and self-reinforcement. Teachers reviewed the lessons in the Teacher's Guide on self-regulation. They were introduced to examples of self-statements for modelling coping and self-reinforcement; however, the lesson plans indicated that teachers should brainstorm these topics with students to develop additional self-statements. Teachers observed the PI modeling lesson

segments. Teachers practiced lesson segments for peers, again with an emphasis on think aloud modeling and supporting students in writing class texts.

During the subsequent phase of the study, teachers implemented the unit of study with their respective classes. They were visited by a member of the research team who was a very experienced primary teacher with a doctorate in literacy curriculum. She visited each SO and SRSD classroom, and according to the preference of the teacher, either provided demonstration lessons, participated in team teaching, or coached and provided feedback to the teacher.

Measures

Treatment Fidelity

Each class was observed twice during instruction by a member of the research team using a checklist based on the *Teacher's Guide*. Each lesson was divided into segments of one paragraph, each comprising approximately 2 mins of teaching. Observers checked off each section that was completed. Teachers were not expected to literally repeat the text of the lessons. Instead, a segment was considered to be completed if the teacher addressed the content of the segment (e.g., strategy steps, coping, self-monitoring, etc.), and used the appropriate level of gradual release of responsibility (e.g., discussing, modeling, supporting, etc.). Additionally, observers were asked to comment on the following 5 aspects of the lesson:

- Emphasizes strategy/self-regulation components of lesson?
- Pacing allows students to follow?
- Attitude engaging?
- Overall perception: Poor / fair / good / excellent / outstanding?
- Other comments?

Treatment fidelity was high, with a mean 94.4% of segments completed, and a range from 85% to 100% by session. Observers commented positively on the lessons of all teachers in the SO and SDSD condition. Overall, the holistic rating of the lessons averaged 4.63 = (excellent to outstanding) with a range from 4 to 5.

Personal Narrative Writing Samples

The purpose of the writing samples was to assess students' personal narrative writing, operationalized as three dimensions of text quality that have been identified in previous research on Grade 1 writing: Holistic text quality; word count; and story features (Coker, Ritchey, Uribe-Zarain, & Jennings, 2018; Kent, Wanzek, Petscher, Al Otaiba & Kim, 2014; Kim, Al Otaiba, Folsom, Greulich & Puranik, 2014; Wagner et al., 2011). Students received a page with broadly spaced lines and one of two prompts:

- Please write about a time when you went to a party.
- Please write about a time that you played outside.

Students were given a brief large group verbal warm-up and then wrote about the topic. If children were hesitant to write or stopped writing, they were prompted with scripted lines to continue, e.g., "Just do your best." Students typically finished writing in 15 minutes or less and all students completed in less than 20 minutes. If there were any words that the student had attempted that were not legible, the student was asked to read them to the researcher who wrote them above the student's word attempt; no additional text was transcribed for the student.

Holistic Quality. Holistic text quality comprises a valid measure of writing development (Graham, Harris, & Mason, 2005; Kim et al., 2014). The purpose of scoring this dimension was to provide a completely holistic measure of text quality, unbiased by the content of instruction. Therefore, two experienced teachers who were graduate students in literacy education, from

whom the purpose of the study was masked, were asked to rate the texts. Before rating, the writing samples were transcribed with spelling corrected to avoid halo effects caused by handwriting and spelling accuracy; instructional condition was masked. For each topic (Party, Playing Outside), Rater 1 was asked to rate the texts on “overall quality... How good is this text, as a piece of personal narrative writing in Grade 1?” They were asked to use the entire scale from 1 to 9, where 1 represents “lowest quality,” 9 represents “highest quality” and 5 represents “average for this sample.” Rater 1 then selected one anchor text to represent each score from 1 to 9 for each topic and checked that the anchor texts selected to represent a given score for each of the two different topics (Party, Playing) were equal in quality. Rater 2 independently rated the texts with the same instructions and was additionally provided with the anchor texts selected by Rater 1 to assist in scoring. Inter-rater reliability was $r(120) = .93, p < .001$ for the Party texts, and $r = .95, p < .001$ for the Playing Outside texts. On 70.75% of texts the rating was equal, and 96.75% were within 1 point of each other. Differences between the two raters were resolved by averaging.

Word Count. For young children, word count comprises a valid and reliable measure of writing development, which is correlated with holistic text quality but partially independent of it (Coker et al., 2018; Kent, et al., 2014; Wagner et al., 2011). Because students varied in spelling skill and use of spacing to represent word boundaries, raters used the original (not transcribed) texts, so that they could make use of all the textual cues to identify word breaks. Credit was given for each attempted word regardless of spelling accuracy. Inter-rater reliability for word count for both text topics was $r(120) = .99, p < .001$. For 70.0% of texts the word count was identical, and for 92.9% they were within 2 words of each other. Differences between raters for each text were resolved by averaging.

Story Features. Presence of genre-specific genre components is a valid measure of writing development, which is correlated with holistic quality, but partially independent of it (Olinghouse & Graham 2009; Wagner et al., 2011). To develop the list of features, the previous literature was used, as well as an initial clause-level coding of 9 writing samples drawn from the longest texts in all three conditions. To support coding, Table 2 was prepared, with a definition of each code, as well as a good example, a marginal example, and a non-example. Each feature was coded as present/absent for the text as a whole (0/1), except for actions/events, which were counted to a maximum of 3. Each text was scored independently by two raters. To train raters, initially the rating scheme, including Table 2, were presented and explained to the rater. Then, the scoring of three texts was initially modelled. Next, the trainees rated three texts, and discussed them with each other. Then each rater coded the set of texts independently.

Of the story features, two were very infrequent: “dialogue” appeared in only 3% of texts; and “problem-solution” appeared in only 3% of texts. Therefore, those codes were deleted from the analysis; all other codes appeared in at least 15% of texts. The remaining codes were the following: Topic, character, setting in time, setting in place, action/event (up to 3 points), elaboration, meaningful sequence, feeling/thought. The codes were summed, generating a possible maximum score of 10. Inter-rater reliability for total story features for the Party text was $r(120) = .91, p < .001$ and for the Playing text it was $r(120) = .95, p < .001$. Inter-rater reliability for each story feature ranged from 81.7% exact agreement for elaboration, to 96.7% agreement for feeling. For 58.75% of texts the scores of the two raters were equal, and for a total of 92.1% the ratings were within 1 point of each other. Treating the features as items of a scale, inter-item reliability for the scale was acceptable, Cronbach’s alpha = .62. Item total correlations

are listed in Table 2. Additionally, the correlation of each feature with holistic text quality was calculated to verify its validity (Table 2).

Interview on Self-Regulation in Early Writing

The purpose of this interview was to assess students' post-test knowledge about self-regulation in writing. This was a novel measure, so an additional purpose of this analysis was to assess the reliability and validity of the interview itself. The interviewer presented the child with eight brief scenarios describing Grade 1 writers in various situations before, during and after drafting a story. Each item potentially tapped an element of self-regulation identified in the previous instructional literature on self-regulation: Planning, goal setting, self-instruction, self-statements, self-monitoring, coping, self-evaluation, and self-reinforcement (Reid, Lienemann & Hagan, 2013). For each scenario, the student was asked an initial open-ended question about what the writer could/should do, and a second more specific follow-up question (see Appendix One). Interviews were audio recorded.

The student's response to each item was scored on two dimensions: Self-regulation of transcription and self-regulation of composition. SR of transcription referred to applying SR process to handwriting, spelling or punctuation, e.g., "He should check he spelled the words right." SR of composition comprised applying SR processes to the genre or content of the text, "It should have a beginning, middle and end." Each item was scored from 0 to 4 on each of the dimensions (SR of transcription, SR of composition). : No response (0 points); vague or incomplete self-regulation (1 pt); concrete self-regulatory action (2 pts); two or more self-regulatory actions or ideas (3 points). They received an additional point if they provided a self-regulatory response to the first open-ended prompt, prior to receiving the second, more directive

prompt. This created a total of 32 possible points for composition self-regulation and 32 possible points for transcription self-regulation.

Each interview was scored independently by two raters with condition masked. The process of training was similar to that described for story features, comprised of presenting scored excerpts; modelling the scoring of excerpts; and practice with feedback. Inter-rater reliability was $r(120) = .91$ for total score out of 64. For 18.6% of interviews, the total scores were identical between raters; for 84.7% the ratings were within 4 points of each other. Inter-rater reliability was $r(120) = .89$ for the composition subtotal, and $r(120) = .92$ for the transcription subtotal. The correlation between the composition subtotal and the self-regulation subtotal was $r(120) = .02$. Inter-item reliability was Cronbach's $\alpha = .46$ for transcription; $\alpha = .75$ for composition; and $\alpha = .63$ for total score.

Analysis.

The following paragraphs provide an overview of the statistical analysis:

H1: The effect of condition on self-regulation knowledge was tested using a univariate analysis of covariance, with follow-up Bonferroni analyses.

H2: The effect of strategy instruction on text quality was tested using a mixed model repeated-measures analyses of variance for each dependent measure (holistic quality, word count, story features). Follow-up simple ANOVA were conducted at pretest and post-test; Bonferroni analyses were used to compare post-test scores in each strategy condition (SO, SRSD) with the control condition.

H3: The effect of the self-regulatory component of instruction was tested using the same series of mixed model repeated measures analysis as H2. Follow up Bonferroni analyses were used to compare post-test scores between the SRSD and SO conditions.

H4: The effect of strategy instruction across levels of pretest writing was tested using two methods. First, a regression analysis was conducted in which the predictor variables were pretest holistic text quality, a strategy instruction dummy variable (combined SO and SRSD conditions vs control condition), and a pretest by condition interaction term; the criterion variable was post-test holistic text score. In a second analysis, pretest word count was split into three terciles; pretest word count tercile and condition were entered into analysis of variance, in which gain scores were the dependent variable.

H5: To test the mediational hypothesis, a regression analysis was conducted in which pretest holistic quality and a strategy instruction dummy variable were used to predict post-test holistic quality; then self-regulation knowledge was added to the model to determine whether this accounted for (reduced) any effect of instruction on post-test holistic text quality.

Results

Hypothesis 1: Effect of SO and SRSD on Self-Regulation Knowledge

To test the first hypothesis, concerning the effect of SRSD and SO on knowledge about composition self-regulation in writing, an ANCOVA was conducted, with treatment condition as the independent variable, and pretest holistic text quality as a covariate. Data met the assumptions of ANCOVA; two missing values were replaced with the mean to avoid listwise deletion of these cases. The effect of treatment condition on self-regulation knowledge was large and statistically significant, $F(2, 116) = 12.69$, $p < .001$, partial $\eta^2 = .18$ (Table 3). Planned contrasts indicated that mean post-test self-regulation knowledge in the SO condition was significantly higher than in the control condition, contrast estimate = 2.95, $SE = 1.23$, $p = .02$. Post-test self-regulation knowledge in the SRSD condition was in turn significantly larger than in the SO condition, contrast estimate = 3.52, $SE = 1.17$, $p = .003$.

Hypotheses 2 and 3: Effect of SO and SRSD on Writing Measures

To test the second and third hypotheses, concerning the effects of SRSD and SO on writing measures, a series of repeated measures ANOVAs was conducted, each with two levels of within-subject variable time (pretest, post-test), and three levels of the between-subjects variable, condition (Control, SO, SRSD). To meet the assumptions of RM-ANOVA, outliers were winsorized to the nearest non-outlying value. Pretest and post-test word counts were significantly positively skewed, so they were normalized using a square root transformation. For any significant time by condition interactions, follow-up simple univariate tests were conducted on pretest, post-test, and gain scores; post hoc Bonferroni tests were used to locate significant differences among conditions. The means are reported in Table 3. Following a common practice in experimental instructional research, effect sizes for gain scores were calculated using the difference between treatment group gains and control group gains, divided by pretest pooled standard deviation (Morris, 2008). Where the interaction of time by condition was significant, main effects are not reported. Because there were large differences in pretest scores across conditions, we initially present the analysis of all 120 participants; this is followed by an analysis of 81 cases matched across conditions on pretest score.

For holistic text quality, the time by condition interaction was statistically significant and large, $F(1, 117) = 14.95, p < .001, \text{partial } \eta^2 = .20$ (See Table 3). At pretest, holistic quality differed significantly by condition, $F(2, 117) = 6.99, p = .001, \text{partial } \eta^2 = .11$. Bonferroni tests indicated that pretest holistic quality in the control condition was greater than in the SO condition, mean difference = .95, $SE = .32, p = .01$. It was also greater in the control condition than in the SRSD condition, mean difference = 1.19, $SE = .34, p = .002$. Pretest holistic quality did not differ significantly between the SRSD and SO groups, mean difference = .24, $SE = .32, p$

= 1.00. At post-test, holistic quality did not differ significantly across conditions, $F(2, 117) = 1.27, p = .28$, partial $\eta^2 = .02$. Gains from pretest to post-test in holistic quality showed statistically significant, large differences by condition, $F(2, 117) = 14.95, p = .001$, partial $\eta^2 = .20$. Bonferroni tests indicated that gains in the SO condition were significantly greater than those in the control condition with a large effect size, mean difference = 1.42, $SE = .32, p < .001$, $E.S. = .93$. Gains in the SRSD condition were significantly greater than in the control condition with a large effect size, mean difference = 1.68, $SE = .33, p < .001$; $E.S. = 1.11$. The difference in gains between the SRSD and SO condition was small and not statistically significant, mean difference = .27, $SE = .31, p = 1.00, E.S. = .17$.

Word count was positively skewed at pretest and post-test, so it was square root transformed; inferential statistics reported in this paragraph were conducted on transformed values; descriptive statistics in Table 3 are raw values. For word count, the time by condition interaction was large and statistically significant $F(2, 117) = 25.97, p < .001$, partial $\eta^2 = .31$. A follow-up ANOVA indicated that at pretest, word count differed significantly by condition, $F(2, 117) = 8.77, p = .001$, partial $\eta^2 = .13$. Bonferroni tests indicated that pretest word count in the control condition was significantly greater than in the SO condition, mean difference = 1.28, $SE = .35, p = .001$. Pretest word count in the control condition was also greater than in the SRSD condition, mean difference = 1.32, $SE = .36, p = .001$. Pretest word count did not differ significantly between the SRSD and SO conditions, mean difference = .03, $SE = .34, p = 1.00$. At post-test, word count did not differ significantly by condition, $F(2, 117) = 1.59, p = .21$, partial $\eta^2 = .03$. Gains from pretest to post-test in word count showed large, statistically significant differences by condition, $F(2, 117) = 25.97, p < .001$, partial $\eta^2 = .31$. Bonferroni tests indicated that gains in the SO condition were significantly greater than those in the control condition, with

a large effect size, mean difference = 1.90, $SE = .29$, $p < .001$, $E.S. = 1.15$. The gains in the SRSD condition were significantly greater than those in the control condition with a large effect size, mean difference = 1.79, $SE = .30$, $p < .001$, $E.S. = 1.08$. Gains did not differ significantly between the SO and the SRSD condition, mean difference = .11, $SE = .28$, $p = 1.00$, $E.S. = .06$.

For the story features measure, the time by condition interaction was statistically significant and large, $F(1, 117) = 16.53$, $p < .001$, partial $\eta^2 = .22$ (See Table 3). At pretest, story features differed significantly by condition, $F(2, 117) = 8.10$, $p = .001$, partial $\eta^2 = .12$. Bonferroni tests indicated that pretest story features in the control were significantly greater than in the SO condition, mean difference = 1.40, $SE = .37$, $p = .001$. Pretest story features were also greater in the control condition than the SRSD condition, mean difference = 1.27, $SE = .39$, $p = .004$. Pretest story features did not differ significantly between the SRSD and SO condition, mean difference = .14, $SE = .37$, $p = 1.00$. At post-test, story features differed significantly by condition, $F(2, 117) = 3.63$, $p = .03$ partial $\eta^2 = .06$. Bonferroni tests indicated that at post-test, story features in the SO condition were marginally greater than in the control condition, mean difference = 1.18, $SE = .49$, $p = .05$. Post-test story features were also marginally greater in the SRSD condition than the control condition, mean difference = 1.17, $SE = .51$, $p = .07$. Post-test story features did not differ significantly between the SRSD and SO conditions, mean difference = .01, $SE = .48$, $p = 1.00$. Gains from pretest to post-test in story features differed significantly by condition, $F(2, 117) = 16.53$, $p < .001$, partial $\eta^2 = .22$. Bonferroni tests indicated that gains for the SO condition were significantly greater than the control condition with a large effect size, mean difference = 2.58, $SE = .49$, $p < .001$, $E.S. = 1.46$. Gains in the SRSD condition were significantly greater than in the control condition with a large effect size, mean difference = 2.43,

$SE = .51, p < .001, E.S. = 1.37$. Gains in story features did not differ significantly between the SO and the SRSD condition, mean difference = .15, $SE = .48, p = 1.00, E.S. = .09$.

Effect of SO and SRSD on Writing, 81 Matched Cases

In the analysis above, it was found that for all three measures, pretest scores were significantly greater in the control condition than the SO and SRSD conditions. This inequality of pretest scores raises the question of whether ceiling effects, or some other unaccounted-for interaction between instruction and pretest writing scores, may have caused the differences in gains among the conditions. To control statistically for pretest writing, a second analysis was conducted on a subset of participants matched across the three conditions on pretest word count. Word count was selected because it is a valid measure of writing development, and because it is precise enough to select unique matches. Beginning with the student with the lowest pretest word count in the control group, each student was matched with the students with the same or nearest word count in the SO group and the SRSD group respectively. If there was more than one equally close match, a match was randomly selected from the tied scores. Because there were more low pretest scores in the SO and SRSD groups, and more high pretest scores in control group, this resulted in 81 students who could be matched (27 sets of 3 matched students), and 39 students who could not be matched.

The RM-ANOVAs were repeated with this subset of 81 matched students. The result of this analysis is reported concisely here; see Table 4 for descriptive statistics. At pretest, the three conditions did not differ significantly on holistic quality, word count, or text features. For holistic quality, gains from pretest to post-test showed statistically significant, large differences by condition, $F(2, 78) = 8.76, p < .001, \text{partial } \eta^2 = .18$, such that both the SRSD and SO conditions resulted in large and statistically significant gains relative to the control; these two

strategy conditions did not differ significantly from one another (Table 4). For word count, gains from pretest to post-test showed statistically significant, large differences by condition, $F(2, 78) = 12.90, p < .001$, partial $\eta^2 = .24$, such that both the SRSD and SO conditions resulted in large and statistically significant gains relative to the control, and did not differ significantly from one another. For story features, gains from pretest to post-test showed statistically significant, large differences by condition, $F(2, 78) = 9.60, p < .001$, partial $\eta^2 = .20$, such that SRSD and SO resulted in large and statistically significant gains relative to the control; the two strategy conditions did not differ significantly from one another (Table 4). For composition self-regulation knowledge, an ANCOVA was conducted with pretest text quality as a covariate to reduce noise. Self-regulation knowledge differed significantly by condition, $F(2, 75) = 10.44, p < .001$, partial $\eta^2 = .22$, such that the SO resulted in significantly greater self-regulation knowledge than the control condition, and the SRSD condition in turn resulted in significantly greater SR knowledge than the SO condition. In summary, with respect to pretest to post-test gains, the results of the analysis of 81 matched students directly paralleled the results of the analysis of the full sample of 120 students.

Hypothesis 4: For Whom Were SRSD and SO Effective?

This question was examined in two ways with similar results. In the first analysis, pretest holistic text quality was treated as a continuous variable and a mixed model regression analysis was applied to the sample of 81 matched participants. Because the effects of SRSD and SO were similar in the analyses above, condition was treated as a dummy variable, with both forms of strategy instruction (SRSD, SO) = 1 and Control = 0. Condition, pretest holistic text quality, and the pretest holistic text quality by condition interaction term were entered into a regression analysis as predictor variables; the criterion variable was post-test holistic quality. The model

was statistically significant, $F(3, 77) = 23.20, p < .001$; it accounted for 32.2% of the variance in post-test holistic text quality. Significant predictors were pretest holistic text quality, partial $r = .29, p = .009$, and condition, partial $r = .21, p = .06$. The interaction term was not statistically significant, $r = .11, p = .34$. That is, the effect of instruction did not differ significantly across levels of pretest holistic text quality.

To investigate the possible interaction of pretest writing with instruction in second way, the 81 matched cases were split at the 33.3 and 66.6 percentiles based on pretest word count to form three bands: lower tercile, with word count $M = 7.29, SD = 3.44$; middle tercile, $M = 15.36, SD = 1.58$; and upper tercile, $M = 29.73, SD = 11.83$. As with the previous analysis, the two types of strategy instruction (SRSD, SO) were combined to increase statistical power. The dependent variable of interest was holistic text quality gains (that is, post-test holistic text quality subtract pretest holistic text quality; see Table 5). The main effect of condition was statistically significant and large, $F(1, 75) = 17.68, p < .001$, partial $\eta^2 = .19$. Pretest tercile did not have a significant main effect on gains in holistic text quality, $F(2, 75) = 1.15, p < .32$, partial $\eta^2 = .03$. Condition did not interact significantly with pretest tercile, $F(2, 75) = .99, p < .60$, partial $\eta^2 = .01$. This indicates that the effect of instruction did not differ significantly across lower, middle, and upper pretest word count terciles.

To follow up on this ANOVA, descriptive statistics were examined, and a t-test on the effect of condition was conducted for each tercile (see Table 5). For the lower tercile, the effect of condition was statistically significant and large in size, $t(26) = 2.32, p = .02, E.S. = .94$. For the middle tercile, the effect of condition was also statistically significant and large in size, $t(23) = 3.95, p < .001, E.S. = 1.40$. For the upper tercile, the effect of condition was marginally significant and medium to large in size, $t(26) = 1.58, p = .07, E.S. = .68$.

Hypothesis 5: Mediation

To test whether the effect of strategy instruction on writing was due to the effect of instruction on students' self-regulation knowledge, a mediational analysis was conducted. Because the three writing measures correlated strongly, for conciseness post-test holistic text quality was selected as the criterion variable. For this analysis, condition was treated as a variable with three levels: Control = 0, SO = 1, SRSD = 2. First, to test the unmediated model, a regression was generated with condition and pretest holistic text quality as predictor variables, and post-test holistic text quality as the criterion variable. The model was statistically significant, $F(2, 117) = 23.20, p < .001$; it accounted for 28.4% of the variance in post-test holistic text quality. The significant predictors were pretest holistic text quality, partial $r = .54, p = .001$, and condition, partial $r = .29, p < .001$. Next, to test the mediated model, composition self-regulation knowledge was added to the previous model as a predictor variable. The mediated model was statistically significant, $F(3, 116) = 23.24, p < .001$ and accounted for 37.5% of the variance in post-test holistic text quality. The significant predictors were pretest holistic text quality, partial $r = .41, p < .001$, and composition self-regulation knowledge, partial $r = .35, p < .001$. Thus with self-regulation knowledge in the model, the effect of condition was partially nullified, partial $r = .15, p = .09$. This indicates that the effect of instruction on post-test holistic text quality was partially mediated by composition self-regulation knowledge.

Discussion

This study joins three other recent publications among the few experimental studies on teaching writing strategies in Grade 1 (Arrimada et al., 2019; Traga Philippakos, 2019; Traga Philippakos, MacArthur & Munsell, 2018). We investigated the effects of strategy instruction, and the effect of self-regulation instruction, on Grade 1 personal narrative writing. Strategy

instruction was adapted for young children in several ways: Picture books were used to teach aspects of self-regulation; gestures and rhymes were used to support strategy learning; students practiced strategies using reciprocal teaching of teachers and peers; and concrete materials and procedures were used to make self-regulation less abstract. To assist beginning readers, students rehearsed strategies and texts orally; icons and illustrations were used to support decoding. Partner writing was used to assist students who were not yet transcribing fluently. The students' pretest and post-test writing was assessed with respect to holistic text quality, word count and story features. Students' self-regulation knowledge was assessed through a post-test interview.

Does SRSD Increase Self-Regulation Knowledge?

As predicted, SRSD significantly increased knowledge about the self-regulation of composition. Full SRSD produced significantly greater self-regulation knowledge than strategy instruction alone, which in turn produced significantly greater self-regulation knowledge than the control condition. For several students, this reflected the application of the strategy at various times during writing, e.g., planning to include each part of a story; writing these elements in the text; or checking for these elements after writing. Conversely, transcription self-regulation did not differ significantly among conditions; this was expected because it was not the focus of instruction. Students in each of the conditions referred to checking stories to ensure that the spelling was correct, that there were capitals and periods, etc.

This interview measure of self-regulation in writing was used for the first time in the present study, so the results should be treated with some caution, and seen as a test of the instrument, as much as a measure of the effects of instruction. The interview was based on previous research on the role of self-regulation instruction in strategy learning, so it was intended to tap knowledge about goal setting, self-instruction, self-monitoring, self-evaluation and self-

reinforcement (Graham et al., 2018; Reid et al, 2013; Santangelo et al., 2016). The measure showed excellent inter-rater reliability and acceptable inter-item reliability. It postdicted pretest writing quality, and it was sensitive to the effect of self-regulation instruction, suggesting that it has validity. However, it requires further investigation, particularly with respect to its predictive and concurrent validity. It should be compared to other valid measures of writing development and tested in contexts beyond a strategy instruction experiment.

Does Strategy Instruction Improve Grade 1 Writing?

As predicted, both versions of strategy instruction (SRSD and SO) produced large, statistically significant gains on all three measures of writing: holistic text quality, word count, and story features. These results replicate those of Arrimada et al (2019), and Traga Philippakos (2019), who also found large, statistically significant effects of teaching a writing strategy to intact classes of students in their first year of formal education. It extends these results to the genre of personal narrative. The current study was conducted in the first term of Grade 1, and although many students had limited transcription skills, this did not prevent them from learning and applying a writing strategy. Similarly, although Grade 1 children have limited executive abilities, this also did not prevent them from learning and applying a cognitive strategy in writing. This independence of self-regulation relative to transcription is consistent with theories of writing development such as the Not So Simple Model of Writing (Berninger & Chanquoy, 2012), and the Direct and Indirect Effects Model of Writing (Kim & Schatschneider, 2017). However, this independence does not negate the importance of also teaching transcription skills to beginning writers.

Does Self-Regulation Instruction Add to the Effect of Strategy Instruction in Grade 1 Writing?

The hypothesis that SRSD, compared to SO, would produce significantly greater effects on text quality was not supported. These results are consistent with previous componential research on the role of self-regulation instruction in writing strategy instruction, which has produced several positive effects of the self-regulatory component, (Brunstein & Glaser, 2011; Glaser & Brunstein, 2007; Kurtz, 1987), and some mixed (Sawyer, Graham & Harris, 1992) or non-significant (Graham & Harris, 1989) effects. This suggests that much of the “work” of SRSD strategy instruction in improving text quality may be the result of teaching the strategy itself, and not the result of other components of strategy instruction, such as self-monitoring, self-statements for coping, and self-reinforcement. However, we do not conclude that instruction in these latter self-regulation processes has no value for Grade 1 writers. Firstly, as noted above, self-regulation instruction significantly increased students’ knowledge about self-regulation in writing (see below). Secondly, as we discuss below, self-regulation knowledge mediated gains in text quality. Thus future research should investigate the effects of the SR component on additional aspects of writing.

Is Strategy Instruction Effective Across Levels of Writing Achievement?

This question was of particular practical importance. A regression analysis showed that condition did not interact significantly with pretest text quality to affect post-test text quality. When cases were split into students with low, medium and high pretest word counts and an ANOVA was conducted, again the interaction with condition was not statistically significant, and the effect of strategy instruction was large and significant for students with low and medium pretest word counts. Anecdotally, we note that during the pretest and initial writing activities, many of these students expressed the feeling that it was difficult to write a story or that they were

not good writers. As the unit progressed, they became more confident. Additionally, many of these students had limited transcription skills.

For students with high pretest word counts, the effect of strategy instruction was marginally significant and medium to large in size, although this difference from the effects for low and medium tercile students was not large enough to comprise a significant interaction. We note that at pretest, on average, students in the higher tercile scored a mean of 4.59, $SD = .87$ on story features. This suggests that higher achieving students were already using several elements of the strategy taught in the present study, explaining why their gains tended toward being more modest.

Does Self-Regulation Knowledge Mediate the Effect of Strategy Instruction on Writing?

As predicted, the effect of strategy instruction (SRSD and SO) on learning was largely mediated by students' self-regulation knowledge about composition. This suggests that SRSD and SO increase text quality because they increase students' knowledge of self-regulation. The mediational analysis reduces the plausibility of alternative explanations for the effect of strategy instruction, such as exposure to text models or practice effects. The role of self-regulation knowledge in mediating gains in writing may seem somewhat at odds with the fact that SRSD did not produce significantly greater effects on text quality than SO. However, the SO group learned the strategy itself, which is one of the processes of self-regulation.

Personal Narrative as a Genre

The genre of personal narrative was selected for this study because it allows students to share experiences that are important to them, and it is commonly recommended and assigned in Grade 1. The results shed some light on how strategy instruction boosted the quality of students' writing in this genre. This strategy included features that significantly correlated with holistic

text quality, including setting in time, setting in place, actions/events (beginning, middle, end), and feeling/thought. The correlations between each of these story features and holistic quality validated the steps of the strategy. However, there were two text features that were exceptions to this pattern. First, “topic” was a story feature that was taught in the strategy, but its presence in student texts did not correlate with text quality. A possible explanation is that for the pretest and post-test, students were assigned a topic in the form of a title, making it redundant for the student to write the topic again in the text itself. Secondly, many students included elaboration in their texts, in which they provided further details about events, characters or other story features. Elaborations in text correlated with text quality, but elaboration was not taught as part of the strategy. This suggests that a step could be added to the strategy in which students “tell more” about other features of the story. This “tell more” step is part of the SRSD “POW” strategy, in which the W stands for “Write and say more” (Harris, Graham & Mason, 2002).

Practical Implications

Based on the results presented here and other recent studies, we recommend that teachers use strategy instruction, such as SRSD, for teaching Grade 1 composition. To date, strategy instruction is the only method of teaching composition to beginning writers that has been subject to multiple experimental and quasi-experimental studies, and the results have been consistently positive. Teachers can use strategy instruction in Grade 1 to teach several genres of writing: narrative (Arrimada et al, 2019), personal narrative (present study), persuasive (Traga Philippakos et al., 2018) and procedural (Traga Philippakos 2019). Initial results indicate that this method can be used for Tier 1 instruction with intact classes, as well as Tier 2 instruction with struggling writers (Zumbrunn & Bruning, 2013). Tentatively, we suggest that teachers can make strategy instruction understandable and enjoyable for Grade 1s by using the activities

described in this and other studies: oral rehearsal of strategies, using children's literature to support themes, students coaching teachers and peers, and teachers providing supports for decoding and transcribing.

This research suggests that teachers can use strategy instruction with Grade 1 students at a range of achievement levels (low, medium, high). They also suggest it would be desirable to provide some enrichment in the form of a more complex personal narrative writing strategy for higher achieving writers. This is of some interest from the perspective of a response to intervention approach. Normally, it is assumed that it is students with low pretest scores who will require small group instruction. However, these results suggest that higher achieving students may also benefit from some small group instruction in the form of enrichment.

Limitations and Future Research

One important limitation of the present study is that due to the COVID pandemic, there was no opportunity to conduct a delayed post-test. A second limitation was that mean pretest scores were significantly higher in the control condition than the two instructional conditions, raising the prospect that ceiling effects in the control condition may have contributed to apparent relative gains for the instructional groups. To rule out the possibility, a subsample of students with pretest scores matched across groups was created. This confirmed the result found in the larger sample: both strategy conditions resulted in large gains on all measures of text quality relative to the control.

The results of the mediational analysis indicated that self-regulation knowledge plays a role in the effect of SRSD on writing. However, the RM-ANOVAs indicated that much of the effect of SRSD on text quality comes from teaching the strategy itself. This points to the need for further research on the effects of self-regulation instruction on additional measures of writing

development. We have suggested that two kinds of variables require further analysis. The first are psychological measures, as opposed to textual measures, such as self-efficacy. The second are more distal measures of writing, such as maintenance to a delayed post-test, and savings in time to learn a new strategy. A third issue, as noted above, is that there was some trend toward higher achieving students learning less than others from instruction, apparently because they already included several story features in their pretest writing. This suggests the need for research on differentiating writing beyond basic strategies even in Grade 1. This would be analogous to the several kinds of persuasive writing, with varying degrees of complexity, that have been taught using SRSD (Harris et al., 2008).

Conclusion

Beginning writers often have difficulty generating and organizing ideas and language to create texts. Recent research has adapted strategy instruction for very young writers, making it more concrete, more engaging, and less dependent on students' decoding and transcription skills. With professional development and resource support, Grade 1 teachers can effectively teach SRSD to children in Grade 1. Strategy instruction generates reliable and large effects on the quality of writing for Grade 1 students, allowing them to create texts that are more complete, longer, and higher in holistic quality.

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Table 1

Student Characteristics by Condition

	Control n = 36	Strategy Only n = 45	SRSD n = 39	Statistical comparison
Age in months (Mn, SD)	76.92 (3.57)	76.78 (3.49)	76.79 (3.32)	$F(2, 117) = .02,$ $p = .98$
Gender (pct)	Female = 36.1 Male = 63.9	Female = 48.9 Male = 51.1	Female = 46.2 Male = 53.8	$\chi^2(2, 120) =$ 1.42, $p = .49$
English as a Second Language (Pct)	16.7	11.1	7.7	$\chi^2(2, 120) =$ 1.49, $p = .48$
Passed provincial writing exam (school level variable; pct)	77.11	74.88	74.69	$F(2, 117) = .90,$ $p = .41$

Table 2

Story Features, Definition and Example,

Correlation with Total Story Features and Holistic Text Quality

Story Feature	Definition	Example	<i>r</i> of Item to Scale	<i>r</i> of item to Holistic Text Quality
Topic	What is the story about? The theme or type of event that is narrated. Typically appears near the beginning of the text. May be formatted as a title or topic sentence. Often a noun phrase.	042: <u>Joshua's Birthday</u> .	.13	.11
Character	Who was involved? A person, in addition to the narrator. May be a name (Felicity) or role (mom).	013: I was riding my bike with <u>my friend Phillip</u> .	.17	.26
Setting: time	When did the action/events occur? May be general (in the summer) or specific (Saturday).	029: I had a snowball fight <u>on the weekend</u> .	.33	.40
Setting: place	Where did the action/events happen? May be general (outside), or specific (at Springbank Park).	059: In the summer <u>at my old house</u>33	.35
Actions/ events	What happened? An action of a character or narrator, or an event they experience. Often expressed as the main verb in a clause. Score 1 point for each event to a maximum of 3 points.	212: I <u>swam</u> in a pool / and I <u>played games</u> at the party. [Two actions/events].	.44	.71

Elaboration	What was it like? (may concern an action/event, character, or setting). An element that has been reported in a previous clause and is further described in the current clause.	101: We played hockey. <u>We played the Erie Otters.</u>	.24	.40
Meaningful sequence	Does the story make sense? Do the action/events comprise an understandable story? Connections may be explicit or implicit. Action/events may be connected in several ways: Temporal, causal, goal-means.	111: I woke up and had breakfast then I went outside and played with snow and then I made a snow angel and I made a snow man and snow girls and then my Brother came outside and my Dad made a snow pile and me and my Brother slide down and it was fun...	.47	.50
Feeling/ thought	How did someone feel? What did they think? A thought or feeling at any point in the story. May occur during the story as a response to a certain action/event, or as a response to the sequence as a whole. The “appraisal” or “evaluation.”	118: I <u>felt pleased.</u>	.50	.53
Total score	Sum of items		<i>a</i> = .62	<i>r</i> = .84

Table 3

Text Variables and Self-Regulation Knowledge for 120 participants,

By Condition

Dependent variable	Condition								
	Control (n = 36)			Strategy Only (n = 45)			SRSD (n = 39)		
	Pretest Mn (Sd)	Post Mn (Sd)	Gain* Score (Sd)	Pretest Mean (Sd)	Post Mean (Sd)	Gain Score (Sd)	Pretest Mean (Sd)	Post Mean (Sd)	Gain Score (Sd)
Holistic quality	5.08 (1.22)	4.56 (1.59)	-.53 ^a (1.41)	4.13 (1.46)	5.02 (1.39)	.89 ^b (1.53)	3.90 (1.62)	5.05 (1.58)	1.15 ^b (1.32)
Word count**	24.49 (20.24)	20.26 (24.69)	-4.42 ^a (16.35)	12.69 (10.51)	22.66 (14.06)	9.97 ^b (10.97)	13.37 (12.56)	20.29 (12.36)	6.92 ^b (13.98)
Story features	4.06 (1.85)	3.47 (1.83)	-.58 ^a (2.14)	2.66 (1.52)	4.66 (2.20)	2.00 ^b (2.05)	2.79 (1.68)	4.64 (2.47)	1.85 ^b (2.40)
Self- regulation composition knowledge		12.01 ^a (4.83)			13.60 ^b (4.97)			16.74 ^c (7.17)	

*Superscripts that differ represent gain scores that differ $p < .05$, Bonferroni, or Tamhanes where variances are unequal

**Word count was square root transformed; pre and post scores reported are raw values, gains scores are based on transformed values.

Table 4

Text Quality Variables and Self-Regulation Knowledge for 81 matched participants,

By Condition

Dependent variable	Condition								
	Control (n = 27)			Strategy Only (n = 27)			SRSD (n = 27)		
	Pretest	Post	Gain*	Pretest	Post	Gain	Pretest	Post	Gain
	Mn (Sd)	Mn (Sd)	Score (Sd)	Mean (Sd)	Mean (Sd)	Score (Sd)	Mean (Sd)	Mean (Sd)	Score (Sd)
Holistic quality	4.67 (.95)	4.20 (1.48)	-.46 ^a (1.37)	4.78 (1.10)	5.61 (1.33)	.83 ^b (1.53)	4.56 (1.31)	5.52 (1.23)	.96 ^b (1.24)
Word Count**	17.72 (12.31)	15.67 (16.30)	-2.06 ^a (15.87)	17.48 (10.92)	29.02 (13.73)	11.54 ^b (12.56)	17.41 (12.91)	23.20 (12.10)	5.80 ^b (15.92)
Story features	3.46 (1.44)	3.30 (1.91)	-.17 ^a (1.98)	3.20 (1.36)	5.57 (1.99)	2.37 ^b (2.07)	3.41 (1.43)	5.11 (2.13)	1.70 ^b (2.53)
Self- Regulation Knowledge		11.73 ^a (4.77)			15.22 ^b (4.02)			17.48 ^c (7.31)	

*Superscripts that differ represent gain scores that differ $p < .05$, Bonferroni, or Tamhanes where variances are unequal

**For word count, descriptive statistics are raw; inferential statistics are based on square root transformation

Table 5

Holistic Text Quality for 81 matched participants, Pretest, Post-test, Gain Score

By Condition and Pretest Tercile

Pretest Tercile	Condition					
	Control (n = 27)			S0 and SRSD (n = 54)		
	Pre Mn (Sd)	Post Mn (Sd)	Gain Score (Sd)	Pre Mean (Sd)	Post Mean (Sd)	Gain Score (Sd)
Lower (n = 28)	3.61 (.65)	3.44 (1.49)	-.17 (1.66)	3.58 (1.03)	4.87 (1.41)	1.29 (1.50)
Middle (n = 25)	4.94 (.39)	4.17 (1.06)	-.78 (1.12)	4.81 (.40)	5.75 (.93)	.94 (1.00)
Upper (n = 28)	5.44 (.58)	5.00 (1.56)	-.44 (1.36)	5.63 (.91)	6.11 (1.10)	.47 (1.48)

Figure 1

Strategy Bookmark, Rhyme, and Gestures

Icon	Step	Rhyme	Gesture
	Topic	<i>"A story has a topic</i>	<i>Topic- show a lightbulb coming on above your head (closed fist and then spread fingers open)</i>
	Setting	<i>and a setting-where and when.</i>	<i>Setting – roof above your head (like the house symbol)</i>
B	Beginning	<i>A story has a beginning</i>	<i>Beginning – open a book</i>
M	Middle	<i>and a middle</i>	<i>Middle -turn some pages</i>
E	End	<i>and an end.</i>	<i>End - close the book</i>
	Feeling	<i>A story has a feeling too, my friend!"</i>	<i>Feeling – touch your heart</i>

*Appendix One**Interview on Self-Regulation in Writing*

1. Ravi is in Grade 1. He is going to write a story about himself. It is about something fun that he did [**planning**]
 - a. What is the first thing he should do?
 - b. Should he make a plan before writing? How could he make a plan?
2. Ravi is writing a story about himself. [**criteria / goal setting**]
 - a. What makes a story really good?
 - b. Is there anything else that makes a story really good?
3. Jessica is a girl in Grade 1. She is writing a story about herself. [**strategy/ text structure**]
 - a. What parts should her story have?
 - b. Are there any other parts she should put in her story?
4. Jessica is writing the story about herself. [**self-statements: open-ended**]
 - a. Is there anything she could say to herself to help write a good story? [If yes] What could she say?
 - b. Could she say anything else to herself? [If yes] what?
5. Mark is a boy in Grade 1. He is writing a story about himself. He is in the middle of writing [**self-monitoring**]
 - a. What could he do to make sure that his story is good?
 - b. Should he check his story? [If yes] what should he check for?
6. Mark is writing his story. But he is tired of writing. He is bored. He is worried that he might not finish. [coping]
 - a. What could Mark do?
 - b. Is there anything Mark should say to himself?
7. Fatima is in Grade 1. She has just finished writing a story about herself. [**reviewing/ self-assessment**]
 - a. What should she do now?
 - b. After Fatima finishes her story, should she check it? [If yes] What should she check for?
8. Now Fatima has read her story and checked it. It is really good [**self-reinforcement**]

- a. What could she do now?
- b. Is there anything she should say to herself? [If yes] what?