Self-Regulated Strategy Development: Effects on Writers with Autism Spectrum Disorders

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Abstract: This replication study examined the effects of a planning and self-regulation strategy on the story writing abilities of young children with autism spectrum disorders (ASD). Three second graders with ASD were taught a strategy for planning and writing a story using the self-regulated strategy development (SRSD) approach. After learning the strategy, students’ stories included more story elements, were longer, and received higher scores on a holistic scale. In addition, increases in planning time were noted. Results support similar outcomes from Asaro-Saddler and Saddler (2010) and provide further evidence that the SRSD approach can improve the story writing abilities of young students with ASD. This study also extends the findings by demonstrating the special education teachers, rather than trained instructors, can effectively implement the strategy with fidelity.

Learning to express their thoughts in writing is an important skill for school-aged children to acquire. Writing tasks are the primary means by which students demonstrate their knowledge in school, and the major instrument teachers use to evaluate academic performance (Graham & Harris, 2005). For many students, however, writing is a complex task that requires a great deal of time, effort, and energy. Researchers and teachers have recognized and documented the difficulty of writing for regularly achieving students (cf. Scardamalia & Bereiter, 1986; Bereiter & Scardamalia, 1987) and for students with learning disabilities (cf. Graham & Harris, 2005); however, little research has focused on the writing characteristics and the potential of interventions for children with other disabilities, in particular, children with autism spectrum disorders (ASD). This lack of research is surprising, given that writing is an area in which children with ASD have considerable difficulty (Griffin, Griffin, Fitch, Albera, & Gingras, 2006). In one study (Mayes & Calhoun, 2008), for example, 63% of students diagnosed with ASD also exhibited a writing disability. To effectively support this currently underserved population of children, the writing characteristics of children with ASD must be fully documented, and beneficial interventions validated.

Writing Characteristics of Children with ASD

What is currently known about children with ASD is that they exhibit a wide variety of characteristics that may inhibit their abilities to write effectively. Cognitive/academic characteristics, such as highly literal thinking, inability to understand abstract concepts, lack of imagination, and difficulty imagining possible future events and scenarios (Harbinson & Alexander, 2009; Myles, 2005; Myles & Simpson, 2001; Winter, 2003) challenge their ability to plan and write an imaginary story. Deficits in theory of mind and ability to take another’s perspective (McCoy, 2011) make it difficult for children with ASD to write for an absent audience. They may also lack organizational skills, working memory, and story recall ability (Gabig, 2008; Moore, 2002), which hinder the act of planning in advance of writing through the use of notes to formalize ideas, then translating those notes into a story. In addition, they may have motor/coordination is-
sues (Falk-Ross, Iverson, & Gilbert, 2004), which could impact their ability to write and/or type papers.

In addition to these characteristics, deficits in self-regulation also impact writing abilities for children with ASD (Asaro-Saddler & Saddler, 2010). Difficulties in self-regulation are common in many children with ASD (Gomez & Bard, 2005). For these children, deficits in several executive function components, including planning, cognitive flexibility, inhibition, and self-monitoring (see Hill, 2004, for a review), which directly impact the ability to self-regulate, may be present. Executive function deficits may impair the carrying out and monitoring of the essential cognitive processes writers need to effectively manage during the writing process (Saddler, Moran, Graham, & Harris, 2004).

Self-regulation procedures can potentially improve the ability of students with ASD to complete tasks and may improve academic skills development (Whalon, Al Otaiba, & Delano, 2009). Unfortunately, while researchers have widely assessed the self-regulation abilities of children with ASD (Joseph, McGrath, & Tager-Flusberg, 2005; Koegel, Koegel, & Carter, 1999), few have looked at self-regulation in academic areas such as writing.

**Self-Regulated Strategy Development**

One empirically validated model for teaching strategies to less skilled writers with deficits in self-regulation is the self-regulated strategy development (SRSD) approach. Self-regulated strategy development is one of the most well-researched writing interventions conducted for students with and without disabilities. A recent high-profile meta-analysis indicated that studies utilizing the SRSD approach had an effect size of 1.14, a very high effect, compared to an effect size of 0.62, a moderate effect, for other types of strategy instruction (Graham & Perin, 2007a). One of the reasons for this success is that SRSD combines instruction in specific content related strategies (i.e. story planning) with training in self-regulation strategies, such as self-monitoring and self-reinforcement (Harris & Graham, 1985).

SRSD helps writers (a) master higher level cognitive processes involved in writing such as ideation and audience awareness, (b) develop the ability to mindfully monitor their use of writing strategies while writing, and (c) form positive attitudes about the act of writing and themselves as writers (Harris & Graham, 1996). When teaching a strategy through SRSD, Graham and Harris (1993) recommended that a teacher work through six stages of instruction. These stages serve as a metascript, which a teacher should modify to meet his or her students’ needs. The stages include (a) develop background knowledge, (b) discussion of the strategy, (c) modeling of the strategy and self-instructions, (d) memorization of the strategy, (e) support and collaborative practice, and (f) independent practice (Harris & Graham, 1996). Four techniques to increase learners’ self-regulatory abilities are also incorporated throughout these stages, including: self-instructions, self-monitoring, goal setting, and self-reinforcement (Graham & Harris, 2005).

Variations of the SRSD approach have been successfully employed to improve the writing of children with learning disabilities (see Graham & Harris’s [2003] meta-analysis), students with emotional and behavioral disorders (Mason, Kubina, Valasa, & Cramer, 2010; Mastropieri et al., 2009) and attention deficit hyperactivity disorder (Reid & Lienemann, 2006), and most recently children with ASD (c.f. Asaro-Saddler & Saddler, 2010; Delano 2007a; Delano 2007b). The present study replicates and extends Asaro-Saddler and Saddler (2010).

The Asaro-Saddler and Saddler (2010) study examined the effectiveness of providing early supplemental instruction in planning and writing utilizing SRSD with one fourth grade and two second grade students with ASD. In that study, a mnemonic to guide the overall writing process and an additional mnemonic for planning a story were used. The overall writing mnemonic, POW, prompted the writers to Pick ideas, Organize notes, and Write and say more. The story planning mnemonic (WWW, What = 2, How = 2) cued the writers to develop ideas for seven essential story elements by asking a series of questions: Who are the main characters, Where does the story take place, When does the story take place, What do the main characters do or want to do, What happens next, How does the story end, How do the main characters feel. The
two strategies were taught through a series of six lessons based on recommended stages of instruction (see Procedures section) described by Graham and Harris (1993). Before SRSD instruction, students typically produced relatively short and incomplete stories of lower overall holistic quality. At baseline, the students’ stories were, on average, 20 words long, included 2.5 of the seven possible story elements, and averaged a 1.9 score on an 8-point quality scale. The students also did not create any planning notes prior to writing their baseline stories. Post-instruction results indicated the strategy improved the students’ planning time and story writing ability. Following the SRSD instruction, all students’ stories included more story elements, more words, and were qualitatively better. At post-test, the students’ average number of elements increased to 6.6, and their average holistic quality score doubled to just less than 4.0. They wrote on average 38.6 words, nearly double their baseline number of words. In addition, all three students were observed to use planning in the form of note-taking to organize their thoughts in advance of writing.

Although the results of Asaro-Saddler and Saddler (2010) were encouraging, they represent only one research effort. In the current study, I desired to replicate the strong effects achieved with SRSD on story planning ability with another group of second grade students who have ASD. Therefore, the method, instruments, instructional materials, and instructional procedures were utilized, with one key difference. In Asaro-Saddler and Saddler (2010) a trained graduate student taught the intervention; however, the ability of teachers to implement a given classroom intervention is a critical component of the success of an intervention (Lang et al., 2010), and classroom teachers are the primary intervention agents for the majority of educational and behavioral goals. Therefore, I believed the relevance and ecological validity of this research would be increased by utilizing the participants’ special education resource room teachers to administer the intervention. Because teachers have been used in other SRSD studies (cf. Mason, Kubina, & Taft, 2011) with strong results, I anticipated that the results might be even more robust than those in the Asaro-Saddler and Saddler (2010) study because of the more extensive background and training a teacher of children with ASD should have, as well as the established relationship between the students and their teachers.

Method

Setting and Participants

Participants were selected from a public elementary school in a suburban town in New York State. The school had approximately 50 faculty and staff members and 350 students in grades Kindergarten through Grade 4 who received instruction in various settings including general education classes, inclusion classes, and special education classes. Nineteen percent of students at this school were minority, with 9% having limited English proficiency. Approximately sixteen percent of students were eligible for free or reduced price lunch. In 2010, the school’s New York State exams showed that 63% of students in grade 3 and 72% of students in grade 4 met or exceeded the standard in English Language Arts.

Teachers who agreed to participate in this study were asked to nominate students who met the criteria for this study. The criteria were: (a) a documented diagnosis of an autism spectrum disorder (ASD), (b) deficits in written expression, (c) no comorbid diagnosis of intellectual disability, and (d) ability to write independently with a pencil or pen (as reported by the special education teacher). Deficits in written expression were initially reported by the special education teacher based on writing samples collected during typical writing instruction in her classroom, and confirmed prior to beginning the intervention.

The first participant, Jack (note: pseudonyms are used throughout the study), was a 7.4 year old second grade Caucasian male. He was diagnosed with autism at the age of 2 years 4 months. At the time of the study his primary educational setting was a general education second grade classroom, and he also received resource room support in a small group setting five days per week. His most recent standardized test scores on the Kaufman Assessment Battery for Children Second Edition (KABC-II; Kaufman & Kaufman, 2004) re-
ported standard scores of 100 in Short Term Memory, 87 in Visual Processing, 133 on Long Term Memory, and 107 on Crystallized Intelligence. Jack’s Individualized Education Plan (IEP) writing goal was to write a complete paragraph on topic. His special education teacher described Jack as having “a great imagination” often based on television shows or movies that he had seen. She also reported that he had a great deal of difficulty transferring his thoughts to paper.

The second participant, Grady, was an 8 year old second grade Caucasian male. He also received a diagnosis of autism at the age of 2 years 4 months. At the time of the study his primary educational setting was also a general education second grade classroom, and he also received resource room support in a small group setting five days per week. His most recent test scores on the KABC-II indicate standard scores of 88 in Short-Term Memory, 68 in Visual Spatial Thinking, 102 in Long-Term Memory, and 82 in Crystallized Intelligence. Grady’s writing goals on his IEP were to write a complete sentence, and a topically focused paragraph.

The third participant, Travis, was a 7.2 year old second grade Caucasian male who received a diagnosis of autism at the age of 3. He received resource room support five days per week at the time of the study, as well as consultation support in his general education classroom. Current testing data were not available for Travis. His special education teacher indicated that she needed to provide support to help Travis stay on task during instruction, simplified directions during class-time, and tasks being “broken down” into simpler components. When describing his writing, Travis’ teacher reported that he did not add details to his writing and did not plan prior to writing, and that writing was “one of his least desirable activities.” Travis’ IEP writing goals were to write a complete sentence, and to check his work to be sure that it makes sense.

Two classroom teachers volunteered to teach the intervention in this study. The teachers received extensive training from the author in the SRSD approach. Training occurred over two days and consisted of lecture, handouts, and video modeling. Prior to the training, teachers read articles describing the research, rationale, and steps of the intervention provided by the researchers. During the intervention, the teachers received bi-monthly visits from the author, and also had access to daily communication with the author.

The first teacher, Heather, taught Jack and Grady within her resource room. Heather worked as a special education teacher at the school. She had New York state certification in Special Education and Master’s of Science in Education (M.S. Ed) degrees in both Special Education and Reading. At the time of the study she had twelve years teaching experience, ten of which she worked with children with ASD. The second teacher, Lisa, taught Travis the strategy in her resource room. Lisa was a special education teacher at the school who had New York state certification in Special Education and a Master’s of Science in Education (M.S. Ed) degrees in both Special Education and Childhood Education. At the time of the study she had two years teaching experience with children with ASD.

Materials
Black-and-white line-drawn pictures were used as prompts for writing fictional stories during baseline, post treatment, and maintenance. The pictures were used in prior research with children with ASD (Asaro-Saddler & Saddler, 2010), and were considered to be of interest to students in this age range (Saddler et al., 2004). The stories were previewed by the special education teachers who agreed that they should be of interest to each of the participants. Some of these prompts included pictures of boys and girls in an airplane, a girl holding a large snake, and a giant fish in a small fishbowl. Pictures were presented in pairs and students were asked to pick one picture to write about. The sets were randomized for baseline and post treatment.

Design
A single subject with multiple probes across baselines design was used to investigate the effects of the intervention on the three participants. This design was chosen because it has been used effectively in previous single-subject studies utilizing the SRSD approach (c.f. Asaro-Saddler & Saddler, 2010; Mason, Kubina, Valasa, & Cramer, 2010; Mastropieri
et al., 2009). With this design, an intervention was applied sequentially under the same conditions to three individuals with a goal to achieve the same target behavior (Tawney & Gast, 1984), in this case, number of story elements. After a stable baseline was established (minimum of three data points) for number of story elements, the intervention was initiated with one participant (Gall, Gall, & Borg, 2005), while monitoring of the others through baseline conditions continued (Tawney & Gast, 1984). A functional relationship between dependent measures and participant’s progress was demonstrated only if target skills improved after instruction and if the non-instructed participants’ performance remained at or near pre-intervention levels across baseline.

Baseline: During baseline each student was asked to plan and write stories to establish pre-treatment skill level. The teachers read scripted directions for testing administration. Each time participants wrote a story during baseline they were provided with two pictures and asked to select one. Students were instructed to plan their story before writing and then write a story about the picture topic. No other prompting was provided. The students were given 20 minutes to write. When the participant was finished writing his story, the teachers asked him to read the compositions aloud, so any words that were difficult to read could be identified. A stable number of story elements within two points were required across three baseline stories before each participant entered the treatment phase.

Treatment: Treatment commenced within one week of the final baseline probe. Once treatment began, the teachers followed the six instructional lessons described in the Procedures section. Treatment continued until each student demonstrated mastery of the writing strategy by independently writing a story that included all seven common story elements. Lessons were criterion-based rather than time-based to allow each student to master the six stages of instruction. In general, the sessions lasted approximately 45 minutes each. Lessons were held three times per week. For the first two participants, the total number of sessions was eight; for the third participant, the total number of sessions was seven. All lessons were audio recorded to check fidelity to the script.

Post treatment: After instruction, students entered a post treatment condition, in which they wrote three stories under the same conditions present during baseline. The first post instruction probe was administered within one week of treatment completion.

Procedure

The lesson plans that were used during instruction were based on the SRSD (Harris & Graham, 1992) instructional model. Instruction followed the previously mentioned six instructional stages recommended by Graham and Harris (1993). Six lessons were developed based on these instructional stages. These lessons, which taught the POW + WWW, What = 2, How = 2 strategies, were the same as those used in Asaro-Saddler & Saddler (2010) and are as follows:

Lesson 1. During the first lesson, background knowledge of the parts of a story was developed and the significance and use of the strategy discussed. The first mnemonic device, POW, was introduced and the mnemonic was practiced until participants explained the meaning of POW and its importance. The teacher then discussed the attributes of a “good” story. The teacher and participants created a list of these attributes while emphasizing the idea that good stories make sense and contain seven parts. An additional mnemonic device (WWW, What = 2, How = 2) was introduced. This mnemonic was taught as a “trick” for remembering the seven parts typically included in a story. The teacher displayed a chart listing the letters of the mnemonic device along with their meaning, and discussed how a writer might include each in a story. The teacher then read a story aloud with participants following along silently. The story was then re-read, and participants prompted to identify when a story part was read. As a story part was identified, the teacher wrote the part onto the story parts graphic organizer in note form. The story parts were practiced until the participants could accurately identify all parts.

Lesson 2. The second lesson (and each lesson from this point forward) began with a review and practice of the POW and story
parts reminder strategy until the participants were able to provide and explain each entirely from memory. Instruction then began with the participants analyzing a story written at pretest to identify the presence of story parts. A story parts graphic organizer (see Asaro & Saddler, 2009) was provided for each story and a discussion followed concerning which parts were included and which were not present. The teacher and the participants then discussed ways in which the missing information could be included. Next, the teacher explained that even an included story part could be made better, by adding additional details, for example. The participants were then presented with a “rocket chart” reinforcement tool (see Asaro & Saddler, 2009). The chart depicts a rocket ship with seven boxes. The idea is to fill the fuel tank by including all seven story elements. This chart was used in all lessons.

Lesson 3. During the third lesson, self-statements designed to help elicit good story ideas and story parts were introduced. The teacher modeled the process of story writing using POW and the story parts reminder while encouraging participants to provide ideas for parts. During this process, the teacher verbalized self-instructions to assist with problem definition (e.g. what do I have to do here?), planning (e.g. what comes next?), self-evaluation (e.g. does that make sense?), self-reinforcement (e.g. I really like that part!), and coping (e.g. I’m almost finished!). Once the story was finished, the importance of a writer’s self-talk while writing was discussed. The teacher and participant then discussed types of self-statements that could be used while writing and created a list of statements the participant finds useful.

Lesson 4. During the fourth lesson, time was provided for a collaborative writing experience in which the teacher and the participants crafted a story together using the entire writing process and the graphic organizer. This time, however, the participants lead the process with the teacher only providing occasional support. The participants then read their finished story to the teacher, and graphed the story parts.

Lesson 5. During the fifth lesson, the participants wrote another story without the use of the graphic organizer. Instead, they were given a piece of scrap paper and prompted to plan for each part before beginning to write the story. The participants were also encouraged to use the self-statement list generated in the third lesson. The teacher continued to provide support and encouragement as needed, but the level of each was faded. The story was read aloud and the number of story parts were graphed after completion. This lesson was repeated as many times as necessary until the participants reached criterion (a story that includes all 7 story elements).

Lesson 6. In the final lesson the participants wrote another story without the use of supports and without any assistance from the teacher. They were provided a choice of two pictures, a piece of paper and a pencil, and instructed to plan and write the story. They recited the mnemonic to the teacher as well. When finished writing, they shared the story with the teacher and they graphed the story together. When the participants reached criterion (wrote a story containing all seven elements independently), they moved on to post-testing.

Measures

Before scoring, all writing samples were typed. No changes were made to punctuation or spelling, and any identifying information was removed. Samples were scored for number of story elements, holistic quality, and number of words.

Two graduate students in Educational Psychology served as raters, scoring all writing samples for number of story elements and holistic quality. Both raters received training in scoring. Sample stories were used for practice, and interrater reliability for number of elements and holistic quality was established between the two raters using point-by-point comparisons and calculated by the number of agreements divided by agreements plus disagreements. Reliability was calculated first and then the two scores were averaged to arrive at the final reported scores for number of elements and holistic quality. Differences in scores of one point were averaged, whereas scores that differed by more than one point were discussed until an agreement was reached. Stories were coded, and scorers were blind to the order of the probes.
As in the Asaro-Saddler and Saddler (2010) study, four measures were used to document changes from baseline to post-treatment: number of story elements, overall holistic quality, number of words, and evidence of planning. All of these are measures commonly used in writing research (c.f. Asaro-Saddler & Saddler, 2010; Graham & Harris, 2003).

Number of story elements. Seven possible elements could be incorporated in each writing sample, including main character(s) identification, a description of the time of the story, a description of the place of the story, what the main character(s) does or wants to do, what happens after that, how the story ends, and how the character(s) feel. These elements have been used in prior research (c.f. Saddler et al., 2004) to gauge story completeness, and paralleled the WWW, What=2, How=2 mnemonic. Interrater reliability for number of story elements was 91%.

Holistic story quality. Holistic quality of the stories was measured using an 8-point scale based on work by Graham and Harris (1989). Raters were asked to read each paper to obtain a general impression of overall writing quality. The author introduced and explained the holistic scoring scale, which ranged from a score of 0, including items such as “merely a description of the picture,” “poor sentence structure,” and “lacks imagination,” to a score of 7, which included items such as “contains all story elements,” “contains extra ideas and action,” and “well-detailed.” Interrater reliability for holistic quality of the stories was 95%.

Total number of words. The number of words written for each story were counted using the Microsoft Word’s “Word Count.” A word was counted if it was at least one character long and was separated from other characters by a space before and after it. Story titles were included in the word count. Reliability for word count was not calculated since it was computer generated.

Evidence of planning. To determine if the intervention affected planning behavior, any notes students wrote before or during writing were collected and examined. These included notes written on separate pieces of paper or on the writing sample. Any verbal comments indicating planning or strategy use were also recorded.

Treatment Fidelity

Treatment fidelity was assessed through identical procedures as in the Asaro-Saddler and Saddler (2010) study. In both studies, two procedures were followed. First, teachers checked-off each step of the lesson as it was completed. This helped deliver lessons in accordance with the plan and left a record of instruction completion. Upon examination of the lessons after instruction, approximately 98% of the steps were checked off.

Second, each of the sessions was tape recorded. One half of the total tapes were randomly selected to be reviewed at the end of the intervention by a graduate student in Special Education who listened to the tapes and followed along with a copy of the script to ensure that the lessons were being followed. The tapes indicated that 95% of the steps were followed.

Data Analysis

A visual analysis of the means for number of story elements, number of words, and holistic quality were compared from baseline to post-treatment for each student. In addition to this visual analysis, the data were also analyzed using the percentage of non-overlapping data (PND) procedure described by Scruggs, Mastropieri, and Casto (1987). Using this procedure, 90% of the posttreatment points exceeding the extreme baseline value indicated a very effective treatment, 70–90% an effective treatment, 50–70% a questionable treatment, and less than 50% an ineffective treatment.

This type of analysis was used in this intervention because it is commonly used in single-subject research designs (c.f. Mastropieri et al., 2009) and has been proven to detect intervention effects (Campbell, 2004).

Results

Story Elements

All three students increased the number of story elements included in their stories (see Figure 1). Jack increased the number of elements from an average of 1.5 elements (1.5, 2.5, and 0.5) at baseline to an average of 6.3 elements (7.0, 7.0, and 5.0) at post-treatment. Grady improved from an average of 1.5 elements (2.0, 0.5, 2.0, and 1.5) at baseline to 6.8
elements (6.5, 7.0, and 7.0) at post-treatment. Travis increased from an average of 2.1 elements (1.5, 2.0, 2.0, 3.0, and 2.0) at baseline to 6.3 elements (6.0, 7.0, and 6.0) at post-treatment. The percentage of non-overlapping data was 100% for all participants, indicating a very effective treatment.

Holistic Quality

In examining overall story quality, all three students improved their scores from baseline to post-treatment (see Figure 2). Jack had an average of 1.2 quality points (0.5, 3.0, and 0.0) at baseline. He improved to an average of 6.0
Grady had the greatest gains, increasing from an average of 0.9 (1.0, 0.0, 1.5, and 1.0) at baseline to 6.2 (6.5, 5.0, and 7) at post-treatment. Travis improved his average of quality points from 1.5 (0.5, 1.0, 2.0, 1.5, and 2.5) at baseline to 6.2 quality points (6.5, 7.0, and 5.0) at post-treatment. The PND for all students was again 100%, indicating a very effective treatment.

**Number of words**

Each student improved the average number of words from baseline and post-treatment (see Figure 3). Jack wrote an average of 19.0
Figure 3. Number of Words.
words (28, 21, and 8) during baseline and an average of 54.7 words (78, 52, and 34) during post-treatment. Jack’s PND was 100%, indicating a very effective treatment. Grady wrote an average of 6.75 words (10, 2, 9, and 6) during baseline and increased to an average of 38.3 words (40, 30, and 45) at post-treatment. His PND was 100%, indicating a very effective treatment. Travis increased his number of words from an average of 29.0 words (19, 33, 31, 36, and 26) at baseline to an average of 37.0 words (33, 37, and 41) at post-treatment, making his PND 66.6%, indicating a questionable treatment.

Evidence of Planning

Prior to the intervention, participants did not display any overt planning behaviors. Instead, each immediately began writing their story upon hearing the prompt, “You may begin.” The single exception was Travis, who waited ten minutes before beginning to write in the first pretest. There were no notes taken, however, and no other outward indications of planning. After learning the intervention, each student engaged in some type of planning prior to writing. For each participant, this consisted of writing on a piece of scrap paper the WWW mnemonic and writing notes next to the mnemonic. In two instances, Jack was observed to cross off the items from the paper as he included them in his story; Travis did this for one post-test story as well.

Discussion

Results of this study, like those of the Asaro-Saddler and Saddler (2010) study, indicate the self-regulated strategy development (SRSD) approach can effectively improve the planning and story writing skills of students with ASD. In addition, a second outcome from this study was the finding that the students’ special education teachers were able to effectively utilize the intervention within their resource room setting with minimal time invested. This is an important step to help bridge the research-to-practice gap for teachers of children with ASD.

Participant outcomes were in line with several of the recognized characteristics of children with ASD. For example, the students in this study demonstrated that with a concrete, visual support, they were able to plan a story based on a picture. This was not surprising, as children with ASD often perform better when information is presented in a concrete manner (Griffin et al., 2006) and are often visual learners (Moore, 2002). The use of pictures in conjunction with the category labels (i.e., the clock paired with the “who”) may have been especially helpful for this population. In fact, when practicing the strategy, the participants would often refer to the picture, saying, “I remember there was a house,” or, “There were people there.”

Self-regulation, an important part of the SRSD approach, is traditionally lacking in many children with ASD. The intervention used in this study helped students become more aware of their writing activity and how they worked through the writing process. The students engaged in joint goal-setting, used self-statements co-created with their instructors, and self-monitored through the use of the rocket chart. In fact, during post-test, one of the students asked if he could fill in his rocket chart. The students were successful in setting a goal, monitoring their progress through the use of the mnemonic and self-assessing, with minimal support from the teachers.

The creation and use of self-statements, specifically the ability to utilize “self-talk” was challenging for each of the students in the study. This is not unexpected, as some children with ASD tend to have difficulty with self-talk (Joseph, McGrath, & Tager-Flusberg, 2005). Specifically, students had difficulty with problem definition, self-evaluation, and coping self-statements, and tended to rely on using the statements that the teachers suggested as models. The instructors reported that students only used the statements when prompted, and even then they were not sure the students understood them. On the other hand, the students were effectively able to use planning and self-reinforcement self-statements. Interestingly, the planning statements were supported through the use of the mnemonic, and the self-reinforcement statements supported by the rocket chart. This indicates students were effective in managing self-statements when the required task (i.e., planning)
could be paired in the students’ mind with a visual support.

One of the steps of the strategy requires students to answer the question, “What happens next?” This asked the students to think ahead and imagine future events and scenarios, a task that often presents difficulty for children with ASD (c.f. Winter, 2003). In this study, each student was able to answer the “what happens next” question in each post-test that they wrote. This finding may indicate that if students with ASD are taught that a good story requires them to think beyond simply what is in the picture, that they might have success in imagining future events.

Perhaps the most important finding of this study was that teachers were able to learn the SRSD approach to teaching a strategy and effectively utilize it to improve story writing abilities of children with ASD. One difficulty that may arise when teachers, as opposed to trained instructors, administer the intervention in a research study is potential lack of treatment fidelity (Mason, Kubina, & Taft, 2011). This was not the case, however, with the teachers in this study, as supported by the audio tapes of the session, which indicate that 95% of the steps in the lessons were completed as scripted. The teachers both reported that the intervention was useful for their students. They also reported that they had no problem finding time to conduct the intervention. As Heather reported, it was a “quick and easy intervention to teach,” that had “surprisingly good outcomes.” Both teachers indicated that they were surprised by how well the students learned and independently used the intervention after only spending about four weeks total (per student) directly working on it. Lisa also said that she believes learning the intervention will be especially helpful for the students when they have to take their state writing exams. These are crucial findings, as teachers’ willingness to implement a particular intervention may be impacted by how suitable it is for their students, and how easy it is to implement (Graham & Perin, 2007b).

One anticipated outcome is that the results of this study would be even more robust than those of Asaro-Saddler and Saddler (2010). In comparing the results of the two second grade students in Asaro-Saddler and Saddler (2010) and the participants in the current study, findings were nearly identical in terms of percentage of growth for the number of elements included. In terms of holistic quality, students in the current study had a greater percentage of improvement from pretest to post-test. Outcomes were mixed for number of words, with one student (Grady) increasing his number of words to a greater degree than those in the previous study, and the two others (Jack and Travis) increasing their number of words to a lesser extent. These findings are important for two reasons; first, they indicate that teachers of children with ASD, perhaps due to their familiarity and established relationship with students, may have better outcomes when implementing the SRSD approach with children with ASD, specifically in terms of overall writing quality. Secondly, they indicate that school personnel can be trained to effectively utilize the SRSD approach with children with ASD. Results should be interpreted with caution, however, due to the limited number of participants in the studies.

Limitations and Future Research

Of the few SRSD studies that have been conducted with students with ASD, most have used the POW + WWW story writing strategy. While this is an important topic given the needs of students with ASD, such as their lack of abstract ideation, lack of imagination, and difficulty imagining possible future events and scenarios (Harbinson & Alexander, 2009; Myles, 2005; Winter, 2003), it is only one genre. Therefore, future researchers should utilize the SRSD approach to teach children with ASD other genres of writing, such as persuasive. In addition, the participants in this study, as well as those in previous SRSD studies, were high functioning students with ASD, generally defined as at or near average intelligence (Baron-Cohen, 2000). Therefore, the lessons did not need to be modified from their original inception. Teachers and practitioners should consider the individual characteristics of their students, especially those on the low end of the spectrum, and if the lessons should be modified for them.

The current study was conducted in a resource room one-to-one setting. With more students with ASD being included in general education classrooms (Callahan, Henson, &


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Received: 1 May 2012
Initial Acceptance: 16 July 2012
Final Acceptance: 1 October 2012