Planning Instruction and Self-Regulation Training: Effects on Writers With Autism Spectrum Disorders

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ABSTRACT: This single-subject study examined the effects of a planning and self-regulation strategy on the story writing ability of young children with autism spectrum disorders (ASD). Three children with ASD in second and fourth grades were taught a strategy for planning and drafting a story using the self-regulated strategy development (SRSD; Harris & Graham, 1996) approach. After the intervention, all students improved their story writing ability in terms of length, number of story elements, and holistic quality. Evidence of strategy use was also noted in stories written for a noninstructed personal narrative genre. Results suggest that the SRSD approach may be beneficial in improving the writing skills of second- and fourth-grade students with ASD.

Writing is becoming an increasingly important element across curricular areas. However, many children struggle with this key literacy skill. In fact, according to the most recent National Assessment of Educational Progress (Greenwald, Persky, Campbell, & Mazzeo, 2002), the writing performance of 14% of students in Grade 4 falls below a "basic" level of writing achievement. That percentage escalates to 44% for students with an identified disability.

One way to improve educational outcomes for children with disabilities is to provide exemplary writing instruction beginning early in the primary grades before difficulties become more pervasive. Early interventions may maximize the writing development of all children in general, minimize the number of students who develop writing problems as a result of poor instruction, reduce the effects of writing difficulties experienced by children with writing disabilities, and produce more powerful benefits than later remediation efforts (Harris, Mason, Graham, & Saddler, 2002). Early intervention in writing is more effective than waiting until later grades to address difficulties (Harris, Graham, & Mason, 2006).

Although early instructional interventions in writing have proven effectual for students with writing disabilities in general (c.f. Danoff, Harris, & Graham, 1993; Saddler, Moran, Graham, & Harris, 2004), there has been little research conducted in this area with writers with more severe disabilities and, in particular, children with...
autism spectrum disorders (ASD). This is surprising as an increasing number of children are being diagnosed with ASD (Myles & Simpson, 2001) with the Autism Society of America reporting approximately 1 in 150 children receiving an ASD diagnosis (Autism Society of America, 2008) and given that writing is an area that is often challenging for these children (Griffin, Griffin, Fitch, Albera, & Gingras, 2006).

CHARACTERISTICS OF WRITERS WITH ASD

Children with ASD exhibit a wide variety of characteristics that may inhibit their ability to write effectively. For example, they may have motor/coordination issues (Falk-Ross, Iverson, & Gilbert, 2004), which could impact their handwriting. In addition, literal thinking, lack of abstract ideation, and difficulty imagining possible future events and scenarios (Myles, 2005; Myles & Simpson, 2001; Winter, 2003) could undermine their ability to plan and write an imaginary story for an absent audience. Students with ASD may also lack the ability to elaborate their thoughts and write in depth (Myles et al., 2003), and may be less likely to provide causal explanations and insight into mental states (Losh & Capps, 2003), which could make for short, nondescriptive writings. They may further lack organizational skills (Moore, 2002), which may make the act of systematizing and transferring their thoughts to paper difficult, leading to stories that are hard to understand.

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In addition to these characteristics, deficits in self-regulation may impact writing abilities for children with ASD (Myles, 2005). Self-regulation is a central element of writing that skilled writers use to navigate the complexities of the writing process (Graham & Harris, 1993; Hayes & Flower, 1986). The ability to self-regulate in writing involves monitoring, assessing, and reinforcing writing behaviors without depending on prompts from adults or other skilled writers (Harris & Graham, 1996).

Unfortunately, children with ASD exhibit poor self-regulatory abilities. These children typically exhibit distractibility and decreased attention towards a task to a greater degree than a child with a learning disability (Bieberich & Morgan, 2004). They may further lack self-management skills (Koegel, Koegel, & Carter, 1999) and may fail to use self-directed speech to regulate their behaviors (Joseph, McGrath, & Tager-Flusberg, 2005). Although several researchers have used various methods to assess the self-regulation abilities of children and adults with ASD (c.f. Bieberich & Morgan, 2004; Joseph et al., 2005; Koegel et al., 1999), few have focused on self-regulation in academic areas, including writing.

Because of the potential difficulties children with ASD may experience during writing, there is a great need to create and/or validate interventions for children with ASD who struggle with written expression. In addition, because children with ASD commonly lack effective self-regulatory abilities, an intervention shown to improve self-regulation is warranted.

SELF-REGULATED STRATEGY DEVELOPMENT

The self-regulated strategy development (SRSD) model (Harris & Graham, 1996) is an instructional approach designed to improve a writer’s strategic behavior, knowledge, and motivation. SRSD instruction focuses on three goals. First, through direct instruction and guided independent practice, students learn to carry out typical composing processes such as planning. Second, students develop the knowledge and self-regulatory procedures (e.g., goal setting, self-monitoring, self-instruction, and self-reinforcement) they need to utilize the writing strategies while composing. Finally, SRSD targets specific motivational aspects such as self-efficacy and effort.

When using SRSD to teach a strategy, Graham and Harris (1993) recommended that a teacher work recursively through six stages of instruction: develop background knowledge, discuss the strategy, model the strategy/self-instructions, memorize the strategy, support/collaborative prac-
tice, and independent practice. These stages serve as a “metascript” that a teacher should modify to meet student needs. (See Harris & Graham, 1996; Harris, Graham, & Mason, n.d.).

SRSD has improved the writing performance of students with a range of abilities including learning disabilities (e.g., Saddler et al., 2004), attention deficit hyperactivity disorder (e.g., Reid & Lienemann, 2006), struggling writers without a disability (Harris et al., 2006), and typically achieving writers (De La Paz & Graham, 2002). In addition, three recent meta-analyses (Graham, 2006; Graham & Harris, 2003; Graham & Perin, 2007) suggest that SRSD has a strong, positive effect on writing quality and in fact displayed the highest average weighted effect size of any of the writing interventions studied.

SRSD also appears to be a promising intervention for children with ASD. Three studies have attempted to use the SRSD approach to teach writing to children with ASD (Asaro-Saddler & Saddler, 2009; Delano, 2007a; Delano, 2007b). Delano (2007a) utilized the SRSD approach in combination with video modeling to teach persuasive writing to three adolescents with Asperger’s syndrome (AS). Results from this study were generally positive, with each student increasing number of words used, number of essay elements, and time spent writing. These results were not maintained over time, however. Delano (2007b) used the SRSD approach with one middle school student with AS. In this case study, the student was taught a vocabulary strategy for increasing the use of action words and describing words and a strategy for revising. After being taught the strategies, the student increased the number of action words and describing words used, revisions made, and quality of stories written. Asaro-Saddler and Saddler (2009) taught a fourth-grader with AS a planning and story-writing strategy utilizing the SRSD approach. Results indicated that the student increased his number of words, number of story elements, and holistic quality after learning the strategy.

THE PRESENT STUDY

The purpose of this study was to examine the effects of teaching young writers with ASD who have difficulty with written expression how to plan and write fictional stories using the SRSD model. We selected story writing as the instructional genre because stories are frequently assessed on standardized exams such as the New York State English Language Arts (ELA) exam and have been used in prior research with children with ASD (Asaro-Saddler & Saddler, 2009; Delano, 2007b).

This study extends previous research in three important ways. First, we wanted to conduct a more rigorous test of SRSD by using a larger sample of children with ASD and difficulties with writing than had been previously accomplished. Second, we utilized a younger population (two second-graders and one fourth-grader) than the Asaro-Saddler and Saddler (2009) and Delano (2007a, 2007b) studies. We targeted younger writers because early intervention in writing is more effective than waiting until later grades to address writing problems (Harris et al., 2006). Although research suggests that SRSD is effective with young writers with learning disabilities (e.g., Saddler et al., 2004), we cannot say with certainty if young children with ASD can successfully use these strategies or the self-regulation procedures.

Third, this was the first study that examined the extent children with ASD could transfer their knowledge of writing a story about fictional characters using pictures to a story about themselves using a written prompt. Transfer is an important skill that is difficult for young children with ASD to acquire (Hagiwara, 2001-2002), as they may be less able to self-apply their knowledge to a new instructional task, even when the instructional situation is relatively similar (Moore, 2002) Although in this study the students learned to plan and write stories about fictional characters using picture prompts, in the classroom they will be faced with many different genres of writing (e.g., descriptive, persuasive, expository, and narrative) and many different prompts to stimulate thought (e.g., written, picture, movie, songs). In such classes, being able to transfer the ability to plan and write to other genres using a variety of prompts is essential. Could an instructed story-writing strategy using a picture as a prompt improve the participants’ ability to write in an uninstructed genre (i.e., a narrative about themselves) using a written story prompt? If so, this could be viewed as a measure of near transfer.
Based on the success of SRSD in prior research (i.e., Graham, 2006; Graham & Harris, 2003; Graham & Perin, 2007) and on the promising effects with students with ASD in three prior studies (Asaro-Saddler & Saddler, 2009; Delano, 2007a, 2007b), we expected that the writing intervention delivered in this study would have a positive effect on completeness in terms of the story elements, overall holistic quality, and length of stories written by students immediately following instruction and at maintenance. Further, we anticipated that the knowledge gained during the intervention would transfer to an uninstructed genre (personal narrative) using a different type of prompt.

**METHOD**

**DESIGN**

We used a single-subject with multiple probes across multiple baselines design to investigate the effects of the intervention on the three participants. Before instruction, we measured each participant’s fictional story and personal narrative writing ability to establish typical performance levels. A functional relationship between the dependent measures and the participant’s progress was demonstrated only if the target skill improved after instruction and if the noninstructed participants’ performance stayed at or near preintervention levels across baseline. This design is considered particularly effective for students with ASD and is in fact recommended over group designs due to the limited sample sizes of students with ASD with similar characteristics (Simpson, 2005).

**SETTING**

The participants attended a public elementary school in New York. The school had approximately 350 students in kindergarten through Grade 4 who received instruction in various settings including general education classes, inclusion classes, and special education classes. Twenty-two percent of students at this school were minority, with 9% having limited English proficiency. Fourteen percent of students were eligible for free or reduced-price lunch. In 2008, 77% of students in Grade 3 and 69% of students in Grade 4 met or exceeded the ELA standard.

Instruction took place outside the participants’ classrooms in an unoccupied location, (i.e., another classroom, speech room, orchestra room, or conference room). Location of instruction occasionally changed depending on availability of the rooms in the school on various days.

**PARTICIPANTS**

The participants in this study met the following criteria: (a) documented diagnosis of ASD, (b) writing disability or at risk for writing disabilities, (c) no comorbid diagnosis of mental retardation, and (d) ability to write independently with a pencil or pen (as reported by the special education teacher). Deficits in written expression as initially reported by the special education teacher were based on writing samples collected during typical writing instruction in her classroom and confirmed prior to beginning the intervention. As a group, the stories produced by each participant were short and of low quality. Teachers also noted that the students did not engage in any overt planning prior to writing.

To verify the students’ writing ability we administered the Story Construction subtest of the Test of Written Language, 3rd edition (TOWL-3; Hammil & Larsen, 1996) before beginning baseline testing. The Story Construction subtest assesses a writer’s ability to compose complete stories by determining if several important elements are included. Students are provided a picture prompt and asked to write a story about the picture. They are encouraged to plan before they write, and they have 15 min to complete the task. The TOWL-3 has a mean of 10 and a standard deviation of 3. It is able to reliably differentiate between students with strong and weak writing skills, with reliability of .89 at the second-grade level and .90 at the fourth grade level. We considered a deficit to equate to performance at or below one standard deviation below the mean.

The first participant, “Mike,” was a 9-year-old Caucasian male. He had received a diagnosis of Asperger’s syndrome from a medical doctor at the age of 3 and began receiving services at that time. At the time of the study, Mike was in a fourth-grade general education classroom, receiv-
ing pull-out services in special education, speech and language therapy, occupational therapy, and counseling. Recent testing information revealed that he obtained a full-scale IQ score of 84 on the Wechsler Individual Scale for Children—Fourth Edition (WISC-IV; Wechsler, 2003). The WISC has a mean of 100 and a standard deviation of 15. Mike’s classroom writing goals involved staying on topic and writing stories that had a beginning, middle, and end. His individualized education program (IEP) included goals for use of figurative language (e.g., idioms) in his writing. His classroom teacher stated that he was very creative and liked to tell stories, but that he was unable to transfer his thoughts to paper. He was also reported to be easily distracted, and often “lost his train of thought.” Both his classroom and special education teachers reported that his handwriting was difficult to read. His story writing consisted of short, often one-sentence, responses of poor quality that were more descriptions of the pictures than stories. He engaged in no planning prior to writing. He scored a standard score of 5 on the TOWL-3 (Hammil & Larsen, 1996).

The second participant, “Justin,” was a 6-year-old Caucasian male. He had been diagnosed with autism at the age of 2 and began receiving services at the age of 3. He was in a general education second-grade classroom at the time of the study and received services in special education, speech and language therapy, and occupational therapy. Justin’s most recent testing information from the Kaufman Assessment Battery for Children (KABC-II; Kaufman & Kaufman, 2004) did not include a full-scale IQ score. His teachers reported that he was skilled in math, whereas reading and writing were more difficult. The writing goal on his IEP was “to write a minimum of three sentences on a given topic using proper conventions of writing.” His special education teacher reported that he had severe handwriting deficits and was below average in terms of his writing ability, as he was “unable to write stories that contained plot, setting, characters, and other important features.” His story writing was generally of poor quality and often consisted of one-sentence responses (i.e., “one day I was walking”). The stories contained few elements, although at times he included a character’s name and the phrase “one day.” He engaged in no planning prior to writing. He achieved a standard score of 7 on the TOWL (Hammil & Larsen, 1996).

The third participant, “George,” was a 7-year-old Caucasian male in second grade. He had been diagnosed with autism at the age of 3 by a medical doctor and began receiving services at the time of diagnosis. At the time of the study, George was in an integrated second-grade classroom and received services in special education, counseling, speech and language therapy, and occupational therapy. The most recent testing information for George revealed that his full-scale IQ according to the WISC-IV (Wechsler, 2003) was 97. No additional information was available. His special education and classroom teachers reported that he had difficulty with literacy, especially with staying on topic. A single writing goal on his IEP indicated he should “write a minimum of three sentences on a given topic using proper conventions of writing.” George engaged in no planning prior to writing his stories. The final product was often of poor quality and typically consisted of a single sentence that described the picture prompt (i.e., “the rabbit has a carrot”). George achieved a standard score of 8 on the TOWL (Hammil & Larsen, 1996). Even though this score did not meet our deficit criteria, we believed based on his writing sample (“One time that was a camel the gi side get out of here”) he could benefit from the intervention.

Procedures

The first author, who was an advanced doctoral student in Special Education with a Master’s degree in Special Education and teacher certification in Special Education at the time of the study, delivered instruction to all of the participants. She had previous training and research experience in utilizing the SRSD approach to teach planning and story writing. Further, she had experience in teaching students with ASD, and had been a teacher of children on the autism spectrum, as well as other disability groups, for 3 years.

Fictional Story Prompts. We used black-and-white line-drawn pictures as prompts for writing fictional stories during baseline, post treatment, and maintenance. The pictures had been used in prior research with children with learning disabilities (Saddler et al., 2004), with attention deficit
hyperactivity disorder (Reid & Lienemann, 2006), and students at risk for emotional and behavioral disorders who were poor writers (Lane, Graham, Harris, & Weisenbach, 2006). These pictures were considered to be of interest to students in this age range (Saddler et al., 2004). The stories were previewed by the special education teacher who reported that they should be of interest to each of the participants. Some of these prompts included pictures of boys and girls sledding, an alien in a phone booth, and a girl pulling a large cracked egg in a wagon.

**Personal Narrative Prompt.** Along with the picture prompt, we used a written story starter prompt as a generalization task to determine transfer of the strategy to a different writing genre (i.e., personal narrative) from the task completed during the intervention (i.e., fictional story writing). With this task, intended to serve as a near transfer/generalization measure, students were asked to write a personal story about themselves using a written story prompt rather than an imaginative story based on a picture. The personal narrative prompts consisted of written statements such as, “Write about something that happened on the playground” and “Write about a time when you had fun.” These topics had been used in previous research (Saddler et al., 2004) and have been found to be interesting for children to write about. The topics were randomized for baseline and posttreatment.

**Baseline.** During baseline each student wrote fictional stories and a single personal narrative to establish pretreatment skill level for each genre. Each time the participants wrote a fictional story during baseline they were provided with two pictures and prompted to select one. Students were told to plan their story before writing and then write a story about the picture. No other prompting was provided. They had 20 min to write their story. Pictures were randomly assigned to sets, and the order of presentation was also randomized; however, the three students all received the same pictures from which to choose. When the students finished writing their stories, they read them aloud, so that the instructor could identify words that were misspelled or difficult to read. The personal narrative was administered under the same conditions, although provided only one prompt.

We collected a minimum of three baseline fictional stories prior to each participant entering the treatment phase. Students remained in the baseline stage until their stories included a stable number of story elements.

**Treatment.** After students displayed a stable baseline performance for number of story elements, the intervention began and continued until the student demonstrated mastery of the writing strategy by independently writing a story with all required story elements. Lessons were criterion-based rather than time-based to allow mastery of each of the six stages of instruction: develop background knowledge, discuss the strategy, model the strategy/self-instructions, memorize the strategy, support/collaborative practice, and independent practice. In general, the sessions lasted approximately 30 min each.

**After students displayed a stable baseline performance for number of story elements, the intervention began and continued until the student demonstrated mastery of the writing strategy by independently writing a story with all required story elements.**

**Posttreatment.** Immediately after instruction ended, each participant wrote three fictional stories and one personal narrative under the same conditions as baseline. We collected posttreatment probes over a 1-week period for each participant. These compositions were written without any prompting, cues, or guidance from the instructor.

**Maintenance.** Four weeks after the final participant completed posttreatment testing, each participant was administered one fictional story writing task using a picture prompt to measure the durability of the posttreatment achievement levels. As in baseline and posttreatment, these stories were written without any prompting, cues, or guidance from the instructor.

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

Two graduate students unfamiliar with the design and purpose of the study served as raters, scoring all writing samples for number of story elements and holistic quality. The first author provided extensive training in scoring to both raters. 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.

We used four measures to document changes from baseline to posttreatment: number of story elements, overall holistic quality, number of words, and planning time. All of these measures are commonly used in writing research (c.f. Asaro-Saddler & Saddler, 2009; Graham, 2006; Graham & Harris, 2003; Graham & Perin, 2007; Reid & Liemenn, 2006; Saddler et al., 2004). Theoretically, increasing the number of story elements, words, and the amount of planning time should have a positive effect on holistic quality.

**Number of Story Elements.** Seven possible elements could be incorporated in each writing sample: 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 mirrored the WWW, What = 2, How = 2 mnemonic (cf. Graham & Harris, 2005). We used these same elements to rate the personal narratives, as both genres involve similar features (e.g., characters, setting, etc.).

The raters independently scored all writing samples for the 7 elements. Raters had a list of all possible story elements that could be included in the stories and independently scored practice stories for the presence of these elements. After independent scoring, we discussed the stories and compared scores. Training continued until reliability was established (percentage of agreement at or above 80%, maintained over several stories). Interrater reliability for the exact scoring of the writing samples from the study was 78%; however, for scores within one point, reliability was 92%.

**Holistic Story Quality.** We measured the holistic quality of the students' stories using an 8-point scale based on work by Graham and Harris (1989). Scores on the scale ranged from 1, representing the lowest writing quality, to 8, representing the highest. Raters read each paper to obtain a general impression of overall writing quality, focusing on ideation, organization, sentence structure, grammar, and vocabulary. While scoring, raters had an "anchor point" story for a low, middle, and high holistic score; anchor points had been developed and used in prior investigations (e.g., Graham & Harris, 2005; Saddler et al., 2004) and are considered representative of stories written by highly skilled, skilled, and less skilled young writers.

The first author introduced and explained the holistic scoring scale, and then the anchor stories were scored. Following a discussion of how each story differed qualitatively in comparison to the anchor stories, each rater scored the practice compositions independently. After independent scoring, we discussed the stories and compared scores. Scoring continued until reliability was established (percentage of agreement at or above 80%, maintained over five stories). Interrater reliability for the stories was 78%; for scores within 1 point of each other, reliability was 100%.

**Total Number of Words.** We used Microsoft Word's Word Count function to count the number of words in each story; we counted a word if it was at least one character long and was clearly separated from other characters by a space before and after it. We included story titles in the word count. Reliability was not calculated because word count was computer generated.

**Evidence of Planning.** To determine if the intervention affected planning behavior, we collected and examined any notes students wrote before or during writing. These included notes written on separate pieces of paper or on the writing sample. We also recorded any verbal comments indicating planning or strategy use. In addition, we collected the amount of time spent planning prior to
writing. Prewriting planning time was calculated as the time interval between when the instructor told the student to begin writing and when the student began to write the composition.

Social Validity. After completing the intervention, we conducted interviews with each participant to assess the social validity of the intervention. This interview was intended to obtain information on the students' perceived value of the strategies and to assess the effectiveness of the teaching procedures (Harris et al., 2006). We adapted the interview questions from Mason, Snyder, Sukhram, and Kedem (2006): Has using the writing strategies helped you become a better writer? How? What have you learned since working with (instructor)? How do you think these strategies would help other children? If you were the teacher, would you teach these strategies to children? Why? If you were the teacher, would you change anything? From these lessons, what helped you most?

General Instructional Procedures

The planning and story writing strategy included a mnemonic device, POW (Harris & Graham, 1992), to help students organize the planning and writing process by encouraging them to:

- Pick my ideas (i.e., decide what to write about),
- Organize my notes (i.e., develop an advanced writing plan), and
- Write and say more (i.e., expand the plan while writing).

A second mnemonic, WWW, What = 2, How = 2, reminded students to generate notes for seven basic parts of a story during the second step of POW. Each letter of this mnemonic keyed the students to write notes for each of the following questions:

- Who are the main characters?
- When does the story take place?
- Where does the story take place?
- What do the main characters want to do?
- What happens when the main characters try to do it?
- How does the story end?
- How do the main characters feel?

**INDIVIDUAL LESSON PROCEDURES**

The study's six lessons were based on the SRSD instructional model (Harris & Graham, 1992), and utilized the same specific procedures as in previous research (c.f. Asaro-Saddler & Saddler, 2009).

**First Lesson.** During the first lesson, we developed background knowledge of the parts of a story and the significance and discussed use of the strategy. The first mnemonic device, POW (Graham & Harris, 1989), was introduced and the importance explained. Each student practiced the mnemonic until he could explain what POW stood for, and its importance.

The instructor then discussed what makes a story "good," and the instructor and the participant created a list of what constitutes good writing. The idea that good stories make sense and contain different parts was stressed. The mnemonic device WWW, What = 2, How = 2 (Graham & Harris, 1989) was introduced as a "trick" for remembering the seven parts to include in a story. The instructor showed the participant 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 instructor then read a story aloud while the participant followed along silently. Rereading the story, the participant was asked to identify when he heard a story part in the story. As a story part was identified, the instructor wrote it onto a story parts graphic organizer. The story parts were then practiced until the participant could identify all the parts.

**Second Lesson.** Each lesson from this point on began with a review and practice of the POW (Graham & Harris, 1989) and story parts reminder strategy until the participant could provide and explain each entirely from memory. Instruction then began with the participant analyzing a story he wrote at baseline to identify how many story parts were present. If the participant wished, he could do this analysis for all of his stories. A story parts graph was provided for each story and a discussion followed concerning which parts were included and which were not (see Saddler et al., 2004). The instructor and the participant then discussed ways in which the missing information could be included. Next, the instruc-
tor explained that even an included story part could be made better. A “rocket chart” reinforcement tool for each lesson (see Saddler et al., 2004) depicted a rocket ship with seven boxes for the seven story elements; participants would fill in a box for each of the elements included in their story. Students were encouraged to fill the seven boxes by including all seven story-writing elements.

Third Lesson. This lesson introduced self-statements designed to elicit good story ideas and story parts. The instructor modeled the process of writing a story using POW (Graham & Harris, 1989) and the story parts reminder while the participant provided ideas. During this process, the instructor verbalized self-instructions to assist with problem definition (e.g., What do I have 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!). A discussion of the importance of self-talk followed the story writing, with the instructor and participant discussing the types of self-statements that could be used while writing and creating a list of possible statements.

Fourth Lesson. This lesson incorporated time for a collaborative writing experience wherein the instructor and the participant crafted a story together using the entire writing process and the graphic organizer. This time, however, the participant led the process with the researcher only providing support as needed. The participant then read his finished story aloud and graphed the story parts. This stage enabled us to verify memorization of the mnemonic. Mike and Justin had the strategy memorized by this lesson. George received additional practice until he was able to recite the mnemonic by memory without any prompt.

Fifth Lesson. During this lesson, the participant and instructor set a goal to reach all seven story elements. They made a plan for the story together, but the participant took the lead. Instead of being provided with the graphic organizer, the participant was told to plan each part of the story on a scrap of paper before beginning to write it, and reminded to use his self-statements. The instructor continued to provide support and encouragement as needed (pointing to the self-statements list or reminders to use the strategy), but the level of each was faded. After the story was completed, the participant read it aloud; the participant and instructor identified the story parts included, graphed the parts, and noted whether the story met the goal of seven elements. They then discussed how the strategies helped improve each part of the story. Once the participant reached criterion (seven story elements) without the use of the graphic organizer and self-statement list, he began the next lesson.

Sixth Lesson. In this lesson the participant wrote another story without the use of supports or assistance. He was provided a choice of two pictures, a piece of paper and a pencil, and instructed to plan and write his story. He recited the mnemonic to the researcher, and began to write his story. He then shared the story with the researcher and they graphed the story together. When the participant reached criterion (i.e., wrote a story independently that contained all seven elements), he moved on to posttreatment testing.

Treatment Integrity

Two procedures assessed integrity of instruction. First, each lesson was scripted with space provided for the instructor to check off each step as it was taught. This ensured delivery of the lesson in accordance with the plan and gave us a record of instruction completion. The second author checked that all steps had been completed for all participants for all lessons.

Second, we tape-recorded each of the sessions. The second author randomly selected one half of the total tapes at the end of the intervention, and listened to them while following along with a copy of the script to ensure that the lessons were being followed. The second author found that 100% of the steps were followed according to the lesson scripts.

Data Analysis

A visual analysis of the means for number of words, number of story elements, and holistic quality compared baseline to posttreatment to maintenance for each participant for both writing tasks. In addition to this visual analysis, we also analyzed the data using the percentage of
nonoverlapping data (PND) procedure described by Scruggs, Mastropieri, and Casto (1987). We used the following recommended guidelines: 90% of the posttreatment and maintenance points exceeding the extreme baseline value indicated a very effective treatment; 70% to 90%, an effective treatment; 50% to 70%, a questionable treatment; and less than 50%, an ineffective treatment. This type of analysis is commonly used in single-subject research designs and has been proven to detect intervention effects (Campbell, 2004). Table 1 presents means, standard deviations, and PND for each measure.

### RESULTS

#### Fictional Story Elements

All three students increased the number of story elements included in their fictional stories (see Figure 1). Mike increased the number of elements from an average of 3.3 elements (3, 4, and 3) at baseline to an average of 6.6 elements (6.5, 7, and 6.5) at posttreatment. His maintenance story included 5 elements, which was lower than his posttreatment average, but higher than his baseline scores. His PND was 100%, indicating a very effective treatment. Justin improved from an average of 2.5 elements (3, 1.5, 3, and 2.5) at baseline to an average of 6.6 elements (6.5, 6.5, and 7) at posttreatment and 6.5 elements at maintenance. His PND was also 100%, showing a very effective treatment. George had the greatest gains, increasing from an average of 1.6 elements (2, 2, 2, 1, and 1) at baseline to an average of 6.5 elements (6, 7, and 6.5) at posttreatment. At maintenance his story included 6 elements, making his PND 100%, signifying a very effective treatment.

#### Holistic Quality

In examining overall story quality, all three students improved their scores from baseline to posttreatment (see Figure 2). Mike had an average of 3 quality points (2.5, 3.5, and 3) at baseline. He improved to an average of 4.5 (4, 5, and 4.5) at both posttreatment and maintenance. His PND was 100%. Justin improved his average of quality points from 1.7 (3, 2, 1, and 1) at baseline to 3.8 (2.5, 5, and 4) at posttreatment. At maintenance his story scored a 4 in quality, bringing his PND to 75%. George had the greatest gains, increasing from an average of 0.9 quality points (1.5, 1.5, 0.5, 0.5, and 0.5) at baseline to 3.6 quality points (4, 3.5, and 3.5) at posttreatment. His maintenance story scored 3.5 quality points. His PND

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### Table 1

| Participant/Phase | Quality | | Elements | | | Total Words |
|-------------------|---------|---|----------|---|---|
| | M | SD | M | SD | M | SD |
| Mike | | | | | | |
| Baseline | 3.00 | 0.50 | 3.30 | 0.57 | 42.30 | 8.10 |
| Posttreatment | 4.50 | 0.50 | 6.60 | 0.28 | 50.30 | 6.40 |
| Maintenance | 4.50 | | 5.00 | | 61.00 | |
| PND | 100% | | 100% | | 75% | |
| Justin | | | | | | |
| Baseline | 1.70 | 0.95 | 2.50 | 0.70 | 10.75 | 6.02 |
| Posttreatment | 3.80 | 1.25 | 6.60 | 0.28 | 38.30 | 8.62 |
| Maintenance | 4.00 | | 6.50 | | 25.00 | |
| PND | 75% | | 100% | | 100% | |
| George | | | | | | |
| Baseline | 0.90 | 0.54 | 1.60 | 0.54 | 8.20 | 4.49 |
| Posttreatment | 3.60 | 0.28 | 6.50 | 0.50 | 27.30 | 3.21 |
| Maintenance | 3.50 | | 3.00 | | 29.00 | |
| PND | 100% | | 100% | | 100% | |

*Note.* PND = percentage of nonoverlapping data.
was 100%. The PND for all three students, therefore, indicated a very effective treatment.

**Number of Words**

Each student improved the average number of words from baseline and posttreatment (see Figure 3). Participant 1, Mike, wrote an average of 42.3 words (individual number on tests 1, 2, and 3 were 46, 48, and 33, respectively) during baseline and an average of 50.3 words (43, 55, and 53) during posttreatment. At maintenance, his story was longer than all other stories, with 61 words. Mike's PND was 75%, indicating an effective treatment. Justin, wrote an average of 10.75 words (19, 8, 5, and 11) during baseline and increased to an average of 38.3 words (29, 46, and 40) at posttreatment. Justin's final baseline probe actually included more words than the second-to-last probe. However, because the number of elements was used as the phase change variable, we chose to move him into the treatment condition. At maintenance, he wrote 25 words, lower than his posttreatment average, but still over twice as long as his baseline average. His PND was 100%, indicating a very effective treatment. The third participant, George, increased his number of words from an average of 8.2 words (12, 14, 5, 6, 5, 11, and 13) during baseline and increased to an average of 38.3 words (29, 46, and 40) at posttreatment. George's final baseline probe actually included more words than the second-to-last probe. However, because the number of elements was used as the phase change variable, we chose to move him into the treatment condition. At maintenance, he wrote 14 words, lower than his posttreatment average, but still over twice as long as his baseline average. His PND was 100%, indicating a very effective treatment.
and 4) at baseline to an average of 27.3 words (31, 26, and 25) at posttreatment. He wrote 29 words at maintenance, making his PND 100% as well, indicating a very effective treatment.

**TRANSFER TO PERSONAL NARRATIVE**

All participants increased their number of elements from baseline to posttreatment in their personal narratives. Mike only increased slightly, as he included 5 elements at baseline and increased to 6 elements at posttreatment. Justin demonstrated the greatest increase, from 3 elements at baseline to 7 at posttreatment. George increased his number of elements from zero in his baseline narrative to 3 in his posttreatment narrative.

Holistic quality scores of the personal narrative samples also increased for all 3 participants from baseline to posttreatment. Mike, Justin, and George increased from scores of 2.5, 1, and 0 to 4, 4, and 2.5, respectively.

For number of words, Mike remained static, with his baseline narrative sample and his posttreatment sample both containing 40 words. Justin increased his number of words from 5 at baseline to 33 at posttreatment. George also increased number of words, from 2 at baseline to 23 at posttreatment.
EVIDENCE OF PLANNING

Mike did not plan during baseline. He increased planning time to an average of 5 min during post-treatment. Justin also exhibited no planning during his baseline stories. During posttreatment, Justin increased his planning time slightly, to an average of 1 min spent planning. George planned during one baseline probe for 30 s, and then exhibited no planning for the other baseline stories. During his posttreatment stories he planned for an average of 3 min.

SOCIAL VALIDITY

Upon completing the final posttreatment probe, the student responded to a brief six-question interview to determine the social validity of the intervention (Mason et al., 2006):

1. Has using the POW and WWW strategies helped you become a better writer? How? All three participants reported that they thought they were better writers for having learned the strategy. Mike said that he was a better writer because he could write about more things and be sure to include the elements. Justin reported that he “writes
better stories now" because he had more to say. George reported that he was a better writer because he could "write more" in his stories.

2. What have you learned since working with (instructor)? All three participants responded that they learned the strategy to help them include all of the elements in their stories. Mike also mentioned that he learned, "POW can give you power when you write."

3. How do you think these strategies would help other children? All three participants suggested that the strategy could help other children because it would remind them to use more parts in their stories and help them write better stories.

4. If you were the teacher, would you teach these strategies to children? Why? Mike and Justin said that they would because it would help the students become better writers. George said maybe. When prompted, he said that he was not sure because he "would not want to make them write so much," but he "probably would." When asked why he would teach it, he said, "so they could write better stories."

5. If you were the teacher, would you change anything? Mike said that he would only use pictures (instead of the written story prompt) because pictures "are easier to think of a lot to write about." Justin said he would add math to the strategy (math was his favorite subject). George said that if he wrote less it would be better. It should be noted that for several of the lessons George asked the researcher to write for him because his hand "hurt."

6. From these lessons, what helped you most? All three participants noted that the WWW strategy (Graham & Harris, 1989) was the most helpful for them. Mike said that this strategy helped him "write more and think of more things to say." Mike also added that he liked being given a choice of pictures each time, because sometimes it is hard to think of ideas for only one picture. Justin said that the best part was the WWW strategy because it helped him to "add more" to his stories. George agreed that the best part of the lessons was the WWW strategy because it reminded him to include all seven elements. George also commented that he could "use this strategy in the classroom when writing," indicating that he saw the importance of transferring his use of the strategy to other settings.

**DISCUSSION**

Children with ASD exhibit a wide variety of characteristics that may inhibit their abilities to write effectively. Their planning ability is likely impacted by difficulties with abstract thinking and imagining possible future events and scenarios (Myles, 2005; Myles & Simpson, 2001; Winter, 2003). Their stories are typically short, non-descriptive, and poorly organized; these children often lack the ability to elaborate or arrange their thoughts or provide insight into their thinking (Losh & Capps, 2003; Moore, 2002; Myles et al., 2003). Finally, children with ASD may also exhibit poor self-regulatory and self-management skills (Bieberich & Morgan, 2004; Koegel et al., 1999)—and such skills are critical to writing.

Results from this study revealed that instruction in planning and story writing utilizing the SRSD approach improved the quality of story writing for young children with ASD. The participants were able to learn and apply the targeted strategies, and this resulted in better writing on posttreatment and maintenance fictional story probes. This supports the findings of Asaro-Saddler and Saddler (2009) and Delano (2007a, 2007b), who also reported improvements in the quality of stories written by children with ASD after being taught a story-planning strategy through the SRSD approach. Each of our participants further reported that the strategy was useful and that they believed they were better writers after having been taught the strategy, an outcome very similar to the findings from Asaro-Saddler and Saddler. However, in the current study we found that participants generalized their knowledge to a different type of writing task. This result was especially encouraging as children with ASD often have difficulty generalizing skills across tasks (Griffin et al., 2006).

Throughout the study, the students exhibited spontaneous use of the types of SRSD self-regulatory behaviors they had learned (i.e., self-statements, goal setting, self-reinforcement). For example, during a posttreatment session, Mike used a self-statement, saying "I know I can do this" when he was having difficulty remembering one of the elements. We observed self-monitoring on several occasions; the students would use their planning notes to monitor whether they had used
all of the elements in their stories. Mike and Justin both exhibited goal-setting, during instructional sessions when they had failed to use all seven elements in their stories. They both established a goal to include all seven elements in their stories the next day, without a prompt from the instructor. We did not observe any spontaneous use of self-reinforcement during this study.

Each of the students further demonstrated strategy awareness during the transfer task at posttreatment. While writing, Mike said, “This is hard without the picture, but I know I can do it.” He also wrote seven bullets on his paper and crossed them off as he used each of the elements. After he completed the task and was walking back to his classroom, he commented that he knew he left out one of the elements. Justin was also observed to write seven lines and cross them out as he included the elements. George, when given the narrative prompt, asked, “Do I still use the strategy?” He then verbalized the elements of the mnemonic several times while writing.

The particular writing strategy taught in this study involved planning a story. All three participants engaged in little or no covert planning prior to the intervention. It was encouraging to find that after learning the WWW, What = 2, How = 2 strategy (Graham & Harris, 1989), all of the students increased their planning time and showed some overt form of planning while writing their posttreatment stories. Although the time spent planning at posttreatment was still very short, the intervention did appear to increase the participants’ awareness of the need for effective planning in the creation of a higher quality story.

Mike, for example, had difficulty with handwriting and writing for long periods of time, characteristics of many children with ASD (Ghaziuddin, Butler, Tsai, & Ghaziuddin, 1994; Gross, 1994). Perhaps because of these difficulties, he was resistant to planning; he said that it was “too much writing.” Despite these obstacles, he increased the time he spent on planning from zero at baseline to an average of 5 min planning in advance of writing at posttreatment. He also seemed aware that when he did not plan, his stories were lower in overall quality and did not contain as many of the elements. For instance, during the maintenance writing task, he did not plan; after the story was written and read out loud, he was asked if he thought he included all of the elements. He said, “No probably not. Probably because I did not write my notes first.”

Justin also did not engage in planning at baseline, leading to stories that were one-line descriptions of the picture prompt. His posttreatment stories were much more complete in terms of story elements and higher in overall quality. These increases in quality were accompanied by a slightly increased planning time of 1 min. However, this small amount of time may not accurately reflect all of the planning he engaged in, as he demonstrated planning behaviors while writing. For instance, during each posttreatment and maintenance story, Justin wrote seven lines on a sheet of paper that represented the seven story elements. As he wrote an element, he would cross the line out, and then think about what he was going to write next. When asked, he said that he did this “to remember to use all of [his] elements.” This is not atypical of children with writing disabilities, who tend to generate ideas “on the fly” (Graham, Harris, & Mason, 2005, p. 210): ideas are created during writing rather than in advance of writing.

George also exhibited an increase in planning time, from an average of 30 s at baseline to average of 3 min planning at posttreatment. He often wrote the word for the elements (e.g., who or what) and crossed them out as he included that particular element in his stories. During the first posttreatment probe, he spent 5 min planning and often looked at the instructor and said “My brain is thinking.”

**Barriers to Strategy Acquisition**

Although the participants increased performance in the areas assessed, several characteristics typical of children with ASD could have functioned as barriers that prevented more robust skill gains. First, many children with ASD are resistant to change and need sameness, particularly in their scheduling (Moore, 2002). However, the scheduling of the intervention required modifying the students’ daily routine, resulting in one missing his Morning Program time, and another missing time with one of his favorite teachers. These changes proved upsetting to the two affected students (Justin and George) as each informed the
instructor that they would have rather been in their normal routine.

Second, many students with ASD typically exhibit distractibility (Williams, 1995). Knowing that distractibility is a characteristic of students with ASD, we attempted to find quiet distraction-free locations. There were times, however, when other teachers or students walked into or past the instructional location. When this occurred, the students lost focus and required prompting to remain on task. No prompting of any kind was provided during the posttreatment or maintenance phases, however. Finally, the students' difficulty with handwriting and writing for extended periods of time, often typical of children with ASD (Gross, 1994), may also have limited their ability both to acquire the strategy and to produce more effective written products.

**Implications for Practice**

All of the participants demonstrated improvements in their overall story-writing ability and were able to transfer their strategic knowledge of story planning to an uninstructed genre. This is an important outcome, as despite less than optimum conditions, learning the strategy through the SRSD approach had a strong, positive effect on their writing more generally. These findings provide several educational implications for teachers. First, all three participants reported that the mnemonic device included in the SRSD approach, used to teach the steps of the strategy and to organize the story elements, was the most important part of the strategy. This was not surprising, as children with ASD often require that information is presented in a concrete manner (Griffin et al., 2006; Myles & Simpson, 2001) and are often visual learners (Moore, 2002).

In addition, students with ASD often have difficulty with self-regulation, including self-talk (Joseph et al., 2005). Because self-regulation is a key aspect of SRSD, teachers of children with ASD may have to provide extensive training and modeling in supportive self-talk. Working with the students to create a list of self-statements, including self-reinforcement and self-management statements, might be beneficial to these students, as it provides them with a model of how to self-regulate. Training should then occur through direct instruction and practice.

Finally, because handwriting may be problematic for students with ASD, as it was for the participants in this study, teachers should consider an alternative to physically writing the story with pen/pencil. A logical alternative might be to allow the student to use a typewriter or other technology device. Or, they might allow students to orally tell and tape record their stories, and then have a peer transcribe the story for them.

**Limitations**

Although this study provides valuable information into the possible use of strategy instruction utilizing an SRSD approach for students with ASD, there were several limitations. First, there were only three participants in this single-subject study. Future research replicating the study with a larger and more diverse group of participants might determine validity and generalizability of the treatment. Along with the small sample, the intervention period was brief. There were only six lessons lasting between 7 and 9 days, ranging from approximately 2 to 4 weeks of intervention. If the instruction had been delivered for more time, greater gains might have resulted.

The generalization task of writing a personal narrative should be considered with caution. Although the task asked students to write about a past experience rather than a fictional story about a character, the participants might not have distinguished between the tasks and may have just written a fictional story. This was particularly evident in Justin's personal narrative, where he wrote a name rather than "I."

In addition, we were only able to obtain maintenance probes 4 weeks after the study was completed. Therefore, it was not possible to determine whether the students were able to maintain their gains beyond those 4 weeks. Similarly, we were unable to collect writing samples in another setting.

Finally, the participants in this study were generally high-functioning students with ASD, and all had verbal language abilities and minimal behavioral concerns. These particular students required no modifications to the lesson plans. Given the heterogeneity of children with ASD,
lower-functioning students on the spectrum, students with lower cognitive abilities, or students with less developed language abilities might not benefit as much from the intervention without modifications. They may require that skills and strategies be further broken down into simpler steps, and it may take them longer to memorize and utilize them, depending more on cues from the instructor to apply them (Koegel et al., 1999). In addition, students with behavioral concerns might need additional supports, such as an incentive system earning them positive reinforcement for appropriate behavior (Lane et al., 2006).

REFERENCES


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