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### Effects of Self-Regulated Strategy Development for POW+TREE on High School Students with Learning Disabilities

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# Effects of Self-Regulated Strategy Development for POW+TREE on High School Students with Learning Disabilities

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High school students with learning disabilities often have difficulty expressing their thoughts in writing. At the secondary level, writing becomes paramount to successfully navigating the curriculum and expressing knowledge. In this study, the effectiveness of Self-Regulated Strategy Development for POW (Pick my idea, Organize my notes, Write and say more) + TREE (Topic sentence, Reasons—three or more, Examine, Ending) for persuasive quick writes with four high school students with learning disabilities was investigated. Results indicated an increase in the number of response parts written and increased stability in the number of words written. The participants who deemed the intervention as positive provided social validity.

Being able to communicate in writing is an essential skill for academic success. Students who do not demonstrate proficiency in writing are at a disadvantage for academic success as they reach adolescence. These students fall behind in their academic progress and limit their future success in the workplace. In both the school and work environments, writing is the instrument used to assess knowledge and communicate ideas (Graham & Perin, 2007a). Students with learning disabilities (LD) have demonstrated particular difficulties in writing. Students with LD have difficulty planning, organizing, and executing their writing in order to coherently express their thoughts and knowledge. These students also have a tendency to overestimate their ability in written language (Harris, Graham, & Mason, 2003).

Written language becomes increasingly important as students progress through their high school years (Christenson, Thurlow, Ysseldyke, & McVicar, 1989). Academic success relies on a student's ability to use written language to effectively demonstrate his or her knowledge across curriculum areas (Graham & Leone, 1987). To communicate their knowledge, students

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are often asked to complete a variety of written tasks. These writing tasks range from rote recall activities to composing essays to stating facts and opinions. Without strong written language skills, students are at an elevated risk to fall even further behind at the secondary level (Christenson et al., 1989). Fortunately, adolescents who are taught writing in a systematic, explicit manner have shown improvements in their ability to effectively communicate in writing. Writing instruction should be scaffold with students receiving assistance as they learn the process. As the students gain confidence and demonstrate the ability to write independently, the assistance offered by the teacher should be reduced until it is faded out completely (Graham & Perin, 2007a, 2007b).

### SRSD INSTRUCTION

An intervention that has proven effective with students with disabilities is self-regulated strategy development instruction (SRSD). Students are provided explicit teacher-directed instruction focused on a specific strategy. Students are taught the strategy to mastery, while learning to self-regulate their use of the strategy (Sawyer, Graham, & Harris, 1992; Seabaugh & Schumaker, 1981).

SRSD instruction assists students in understanding the writing process including planning, editing/revising, and developing a positive attitude toward writing (Harris et al., 2003). The premise behind SRSD is to provide individualized explicit instruction to students to meet their needs related to the skill being taught (Harris et al., 2003). SRSD can assist secondary students in developing strategies to meet the increased demands of writing as a means to express their knowledge (Harris et al., 2003). It allows teachers to use their current materials and curriculum to meet students' learning needs. A major goal of SRSD instruction is for students to recognize when to use the strategy to assist their learning—not as a single use rote memorization activity that is only good in one specific setting (Harris & Pressley, 1991).

SRSD employs a structured format of instructional stages (develop and activate background knowledge, discuss, model, memorize, support, and independent performance) through which students can progress at their own rate to meet their own learning needs. It is not necessary to teach each stage in isolation; the stages are meant to guide the instruction and should be adapted to meet the individual needs of the student. The stages are structured to initially allow for more teacher support, which is gradually scaled back as the student assumes full control over using and monitoring the strategy (Harris et al., 2003). SRSD instruction also uses specific feedback to guide the student in learning and using the strategy successfully (Sawyer et al., 1992).

SRSD is not meant to be task specific but rather used as a tool by the student in a variety of situations. The key to learning SRSD is that the student understands how to effectively and independently apply the strategy to situations outside the direct instructional environment (Harris & Pressley, 1991). SRSD intervention is most effective when the learner has characteristics that support independence and the task has the ability to be broken down into manageable steps that can be placed in a simple to learn strategy (Graham & Harris, 1987). Students who benefit most from SRSD intervention demonstrate maturity, cognitive ability, ability to tolerate frustration, and the ability to have the attitude to adjust to the expectations of the learning and use of the strategy being presented (Graham & Harris, 1987).

In a meta-analysis of writing instruction for adolescent students, Graham and Perin (2007a) identified a variety of writing interventions, which included the successful use of SRSD. SRSD, used for a variety of writing phases (i.e., brainstorming, editing, writing a story), had a large combined effect size (0.82) with adolescent students' writing. This instructional approach has yielded success in improving the writing of adolescents. Among the recommendations were to provide students a strategic method of instruction to include planning, revising, and editing. However, this analysis was not specific to students with disabilities but rather included students of all ability ranges in grades 4–12. There is a need to extend the current body of research with students with disabilities (Graham & Perin, 2007b).

Given the success of SRSD instruction (Graham & Perin 2007a, 2007b), this study would further enhance the literature base of effective writing instruction comprised of SRSD with students with LD at the secondary level (grades 9–12). Four recent studies (Mason, Kubina, & Taft, 2009; Mason, Kubina, Valasa, & Cramer, 2010; Hoover, 2010) found that SRSD for POW+TREE improved the writing of 10-minute persuasive quick writes for middle and high school students with emotional disturbance (ED) (see Hoover, 2010 for a complete literature review). This study replicated the procedure used by Mason and colleagues (2010) and Hoover (2010) but with students with LD at the high school level. Therefore, systematically extending the SRSD to high school students with LD may improve their fluency in writing 10-minute persuasive quick write responses and improve the quality of the response by writing response parts or elements critical for effective persuasion (e.g., topic sentence, three supporting details, explanations of details, counter reasons/explanation, and conclusion) and number of words written. The following research questions were asked:

1. What are the effects of SRSD instruction on the number of response parts written and number of words written in a 10-minute persuasive quick-write?
2. Was the treatment of SRSD acceptable to high school students with LD?

## METHOD

### Design

A multiple baseline across participants (Kennedy, 2005) was used to measure the effectiveness of the POW+TREE writing intervention for persuasive quick writes before, during, and after instruction. Visual analysis of trend and level was used to determine the effects of the intervention.

*Baseline.* Baseline data were taken from all participants prior to intervention. Once baselines were completed, participants were assigned order of instruction based on their baseline stability. When Matilda, the first participant, completed the instructional phase an additional baseline prompt was given to the remaining participants. Heather began instruction at the conclusion of strategy instruction for Matilda. At the conclusion of Heather's instructional phase, Tracy and Sarah were given another baseline prompt to monitor their progress. Sarah was given a final baseline prompt when Tracy completed the instructional phase. These additional baseline prompts were given to determine if the participants were still in need of intervention or if their writing had improved independently of the strategy instruction.

*Instruction.* Matilda was given five instructional lessons for the SRSD for POW+TREE for persuasive quick writes. Since Matilda did not master the strategy in five lessons, lesson five was repeated. As Matilda entered her postinstruction phase, Heather began her five instructional lessons. Simultaneous with these lessons were Matilda's postinstructional lessons. At the conclusion of Heather's instruction, Tracy began her instruction, while Heather entered the postinstruction phase. Sarah completed another baseline prompt as outlined previously. When Tracy completed her instructional phase, Sarah began her instructional lessons while Matilda and Heather continued to receive postinstructional prompts.

*Postinstruction.* Participants received a minimum of five postinstruction prompts at the conclusion of their instruction. Due to the multiple baseline design of the study, Matilda received six postinstruction prompts. Heather, Tracy, and Sarah each received five postinstruction prompts. These prompts were given to determine the participants' ability to continue to apply the SRSD strategy for POW+TREE with persuasive quick writes after instruction was concluded.

## Setting

The proposed study was conducted in a suburban high school approximately 15 miles south of a metropolitan area in the eastern region of the United States. This high school had an approximate enrollment of 1200 students. The most recent statistics available indicate that 12.8% of the students in the high school were eligible for free or reduced lunch. One hundred fifty two (152) students had Individualized Educational Plans (IEPs). The 152 figure did not include students identified as gifted. Of the 152 students with IEPs at the high school, 112 were classified as students with LD (G. Wilbur, personal communication, March 30, 2010).

## Participants

After a review of IEPs and conversations with English teachers, participants were chosen for the study based on the potential benefit from individualized instruction in their writing. Additionally, participants in this study were chosen by their classification of LD and their willingness to arrive at school early and/or stay after to work with the principal investigator. The principal investigator knew the participants through her work at the high school; she was responsible for direct instruction for all the participants in Language Arts. The parents of the students were informed of the study via e-mail and personal phone calls. Once parental permissions were given via e-mail and/or verbally, consent forms were sent home for parental approval. Parents of the four invited students returned signed consent forms; participants also consented to participate. Prior to starting instruction, participants' writing collected at baseline was examined to validate the teacher recommendation of the student need for the intervention.

*Participant 1: Matilda.* Matilda was a 16-year-old eleventh grade student who had specific LDs diagnosed in reading and writing. Matilda's educational history indicated that she has received learning support services since first grade in the areas of reading, writing, and math. She was given the *Wechsler Intelligence Scale for Children, Third Edition* (WISC-III)

(Wechsler, 1991) when she was in second grade, which resulted in the following scaled scores: Verbal IQ = 76, Performance IQ = 86, and Full Scale IQ = 79. Matilda also participated in the state assessment testing during her eighth grade year in the areas of reading (below basic), writing (basic), and math (below basic). Her IEP goals were related to writing to prompts at the proficient level and reading fluently and comprehending at a sixth grade level. At the time of the study, her math skills had progressed to a level where her needs were being met in a general education classroom. Matilda received direct instruction in reading and writing in the learning support environment during the course of this study. Additionally, she participated in a learning support social studies class and study halls to monitor her progress. All other classes were within the general education environment.

*Participant 2: Heather.* Heather was a 19-year-old twelfth grade student. She was considered a nongraduating senior as she did not have the required credits to graduate and would be returning for a second senior year. In fifth grade, Heather was given the *Wechsler Intelligence Scale for Children, Fourth Edition (WISC-IV)* (Wechsler, 2003). Her scores were: Verbal Comprehension = 85, Perceptual Reasoning = 106, Working Memory = 77, Processing Speed = 97 and Full Scale IQ = 89. At the same time, she was given the *Wechsler Individual Achievement Test, Second Edition (WIAT-II)* (Wechsler, 2001). Her composite scores were: Reading = 76, Mathematics = 67, and Written Language = 74. The results of this testing combined with her classroom performance qualified her as a student with specific LDs in the areas of reading, writing, and math due to the discrepancies between her ability and her achievement. Heather also participated in the state assessment testing in eleventh grade. She achieved the following scores: reading (below basic), writing (basic), math (below basic), and science (below basic). Heather's IEP goals were related to writing at the proficient level and completing assignments. Heather attended general education classes for all subjects except language arts and social studies due to her reading and writing needs during the course of this study.

*Participant 3: Tracy.* Tracy was an 18-year-old twelfth grade student. According to her school records, Tracy was initially evaluated for special education services in second grade. At that time, she was given the *Wechsler Intelligence Scale for Children, Third Edition (WISC-III)* (Wechsler, 1991). The following were her results: Verbal IQ = 104, Performance IQ = 99, and Full Scale IQ = 101. Tracy was also given the *Wechsler Individual Achievement Test (WIAT)* (Wechsler, 1992). Her results in standard scores were: Basic Reading = 78, Mathematics Reasoning = 94, Reading Comprehension = 72, and Numerical Operations = 96. These scores accompanied by her classroom performance provided a discrepancy between ability and achievement in the area of reading. Tracy also participated in the state assessment testing in eleventh grade and obtained the following scores: writing (basic), reading (below basic), science (below basic), and math (basic). Her IEP goals during this study focused on writing at the proficient level, reading comprehension at the sixth grade level, assignment completion, and school attendance. Tracy received all academic instruction in the general education setting except for language arts, where she received direct instruction in the special education setting.

*Participant 4: Sarah.* Sarah was a 16-year-old eleventh grade student. Sarah was initially diagnosed as a student with a specific LD in first grade. At that time, Sarah was given the *Wechsler Intelligence Scale for Children, Third Edition (WISC-III)* (Wechsler, 1991). Her results

were: Performance IQ = 91, Verbal IQ = 72, and Full Scale IQ = 79. Sarah also participated in the state assessment testing in eighth grade, achieving the following scores: writing (basic), reading (below basic), and math (below basic). Sarah's IEP goals for the duration of this study were focused on improvement of reading comprehension skills at a sixth grade level and writing at the proficient level. Sarah received her academic instruction in the general education setting except for language arts and social studies, due to her reading and written language needs.

## Measures

All participants were given five baseline prompts prior to instruction. Baseline data were collected during five 10-minute sessions. Participants were given the following directions for writing: "Please listen carefully as I read these prompts. Please select one of the prompts and write a response to it in your journal. You will have ten minutes to write." If participants finished early no additional coaching was given and their session concluded. Participants who wrote the full 10 minutes were given a one-minute warning when nine minutes had elapsed and were instructed to stop when the 10 minutes expired. At the end of the 10 minutes, participants were told to stop.

Progress was evaluated by examining the students' written responses to persuasive quick write prompts. These writings were known as "quick writes" due to the timed aspect of the data collection. Student quick writes were assessed for the 10 parts of the TREE strategy. All writing prompts were typed with spelling errors corrected prior to being submitted to scorers. To reduce evaluator bias, identifying information was eliminated (Graham, 1999). The quick writes were evaluated by an advanced doctoral candidate and a master's student who were trained in the TREE strategy but blind to the purpose of the study. Each writing prompt was scored for number of TREE components and number of words.

*TREE response parts.* For TREE components each prompt was scored on the basis of the following components: topic sentence, three or more reasons related to the topic sentences, explanations for each reason, a counter reason and explanation, and an ending sentence. Each part was worth one point with a total score of all parts being 10 points. If participants added additional reasons or explanations the response part score exceeded 10.

*Number of words.* Number of words was determined using the word count feature of the Word program, which is part of Microsoft Office 2007. Verification of the count was determined by a manual count of each word. Each scorer manually counted each word written for all quick writes obtained during this study. Word counts were completed for each phase of the study (baseline, instruction, post instruction, and maintenance).

*Fidelity of scoring.* Two advanced graduate students (scorers) were trained in scoring response parts. Scoring fidelity was calculated by taking score agreement and dividing it by the total number of writing samples for 50% of the writings scored. Interrater reliability was computed for the number of response parts at 64% for agreement within 1-point. Number of words was 100% for exact agreement.

*Social validity.* Following instruction, participants were asked six questions regarding their impressions of instruction and POW+TREE writing strategy (Graham, Harris, & Mason, 2005; Harris, Graham, & Mason, 2006): (1) Has using the POW+TREE strategies helped you to become a better writer? How? (2) What have you learned since working with me? (3) How do you think this will help other students? (4) If you were the instructor, what would you change in the lessons? Why? (5) If you were the instructor, would you add anything to help students learn to write? (6) From these lessons, what things have most helped you become a better writer? Participants' oral responses were scripted on the questionnaire form.

## Materials

Each student had a spiral bound notebook to record her writing responses across phases. Specific scripted prompts were used for each phase of this study. Instructional support materials included POW+TREE strategy mnemonic chart, transition word chart, self-statement sheet, and graphic organizer. Materials were the same of those in Hoover (2010), which investigated the effects of SRSD for POW+TREE with high school students with ED. Materials were developed and used in prior research (Mason et al., 2009, 2010; Hoover, 2010).

## Procedures

The principal investigator, who was a doctoral student as well as the classroom language arts teacher for the participants, provided all instruction. The principal investigator was trained in SRSD for POW+TREE for writing persuasive quick writes through a three credit graduate-level class on strategy instruction as well as two, one-hour, one-on-one training sessions. Additionally, the principal investigator participated in a review of the SRSD for POW+TREE with post-testing to ensure understanding of the strategy. Finally, videotaped practice sessions modeling the lessons were reviewed by the SRSD expert and feedback was given to promote accurate instruction. The principal investigator also provided instruction in a prior study to high school students with EBD.

Participants were provided SRSD instruction for the POW+TREE strategy for writing persuasive quick writes. Five instructional lessons were given to each student. These lessons are detailed next. The fifth lesson was repeated with new prompts, as needed, until mastery of the strategy was achieved.

During instruction, the timed component was eliminated for the first four lessons. The researcher examined the writings to determine that each participant fully understood and was able to produce all 10 parts of the TREE strategy. Once mastery of the strategy was observed, the 10-minute time limit was reinstated for the final instructional lesson as well as the postinstructional and maintenance phases of the study.

*Lesson one.* The principal investigator introduced the POW+TREE strategy using the mnemonic chart. The purpose of a quick write and how the knowledge of the strategy would allow her to organize and improve her writings was discussed with the participant. The participant was told that the strategy should improve her ability to do a 10-minute persuasive response. The participant was given a transition word list after the strategy was introduced. It



was explained that the purpose of transition words was to help an author move from one idea to another. This word list was used for the first four instructional lessons to assist her with transitioning from one response part to the next.

Model/anchor writing was used to illustrate all parts of the TREE strategy. The model/anchor writing was read together with the principal investigator assisting the participant with identification the parts of the strategy. Once the participant showed an understanding of the parts, the principal investigator and participant reviewed a personal baseline writing that was chosen by the principal investigator prior to the commencement of the lesson. The participant was then given a graphing sheet to record the parts of the strategy used in the baseline writing. The student graphed the parts of the strategy in her writing on the graphing sheet. Transition words were counted and recorded. Lesson one ended with a review of the strategy and praise to the participant for doing her best. A goal was set with the participant to improve her persuasive writing through the use of POW+TREE.

*Lesson two.* Lesson two began with a review of the POW+TREE strategy. The mnemonic chart, transition word sheet, and graphic organizer were also present during this lesson. The principal investigator modeled the use of the strategy for writing a quick write using “thinking aloud” so the participant could understand the thought process involved with this strategy. Self-statements, positive statements the participant could use to keep writing when having difficulty, were also modeled. After modeling, the participant and principal investigator discussed the strategy process and use of self-statements. The student completed a listing of personal self-statements to be used during her writing.

The participant’s baseline writing reviewed in lesson one was re-written applying the strategy. During the lesson, the principal investigator answered questions from the participant while continually praising the use of the strategy as she improved her writing. At the conclusion of the rewriting, the participant, with the principal investigator’s assistance, graphed the parts of the strategy in the revision. Improvement in writing was discussed. The participant was praised for the improvement in her writing and the lesson concluded with a review of the strategy.

*Lesson three.* The participant orally reviewed of the strategy at the beginning of lesson three. The mnemonic chart was no longer present as it was expected that the strategy was memorized. The participant was presented a blank graphic organizer, the transition word list, and her self-statement organizer. A discussion of times the student would use quick writes occurred while the application of the strategy was discussed. The participant then chose one prompt from two writing prompt options given. Then she planned and wrote the response. The principal investigator prompted her as necessary to encourage use of all parts of the strategy. Once the writing was deemed completed by the participant, the participant and principal investigator jointly graphed the results. Improvements were discussed and the participant was praised for a positive attitude and improvement in writing. At the conclusion of the lesson, the principal investigator thanked the participant for working hard and reminded her that the strategy would be tested again in the next lesson.

*Lesson four.* An oral review of the POW+TREE strategy was the start of lesson four. For this lesson, the participant only had a blank graphic organizer, self-statement sheet, and her notebook to write the response. The participant was presented with two prompts to choose

from for writing. Once a prompt was chosen, the participant began writing. The principal investigator gave limited direction/assistance, as independent use of the strategy was expected at this time. When the participant judged the writing completed, the results were graphed. She was praised for participation and improvement in her use of the strategy.

*Lesson five.* The principal investigator modeled how to use the strategy within a 10-minute time limit at the start of lesson five. To do this, the principal investigator constructed a response using the strategy and using the full 10 minutes. Additionally, the principal investigator modeled how to use time to review and revise the response before time expires. The participant was given two prompts to choose from for her 10-minute quick write. She chose the prompt, wrote the response, and graphed the results. The participant and principal investigator discussed the results and praise was given for the participant's progress and participation.

If the principal investigator believed that the participant was not instructionally firm in the strategy, given the 10-minute time limit, lesson five was repeated. This happened only with Matilda due to spending 6 of the 10 minutes organizing her writing during the first timed lesson. After the administration of the additional lesson, postinstructional prompts were given.

### Fidelity of Treatment

To ensure fidelity of treatment, a high school teacher unfamiliar with the purpose of the study was given a copy of the SRSD for POW+TREE lesson outlines. She then reviewed 30% of the taped instructional lessons to verify that the steps outlined in the lesson were followed. Treatment fidelity based on verifying the number of lesson steps was 100%.

## RESULTS

The duration of this study was 71 days. The time of the study was affected by State Assessment testing, field trips, and participant absenteeism, which will be discussed more thoroughly in a later section. Each participant received a minimum of five instructional lessons. Matilda received an additional instructional lesson due to a need for additional instruction related to managing the time constraints of planning and writing a 10-minute persuasive quick write. At the conclusion of instruction for SRSD for POW+TREE, all participants showed improvement in the number of response parts and the number of words when writing a 10-minute persuasive quick write. Figures 1 and 2 show the results of the multiple baselines for both dependent variables.

*Number of response parts.* For scoring, a 10-response part criterion was established for each response: topic sentence (1 point), three reasons (3 points) and explanations for each reason (3 points), a counter reason (1 point), an explanation for the counter reason (2 points), and a conclusion (1 point). Participants could write these criteria, therefore there was no ceiling for response parts.

Matilda had a moderately variable level of response parts with a rapidly decreasing trend at the baseline phase of the study. After instruction, Matilda had a high level of stability in response parts during the post instruction phase. She demonstrated a moderately increasing

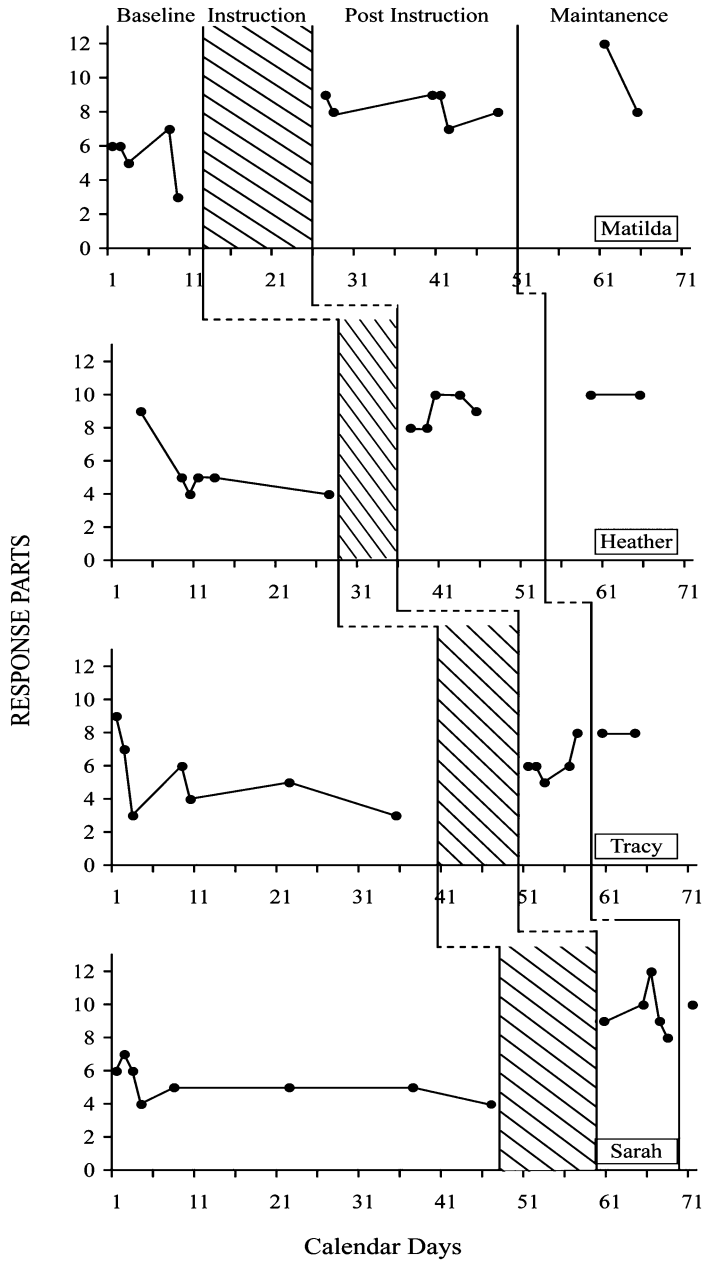


FIGURE 1 The number of TREE response parts for each 10-minute persuasive quick write.

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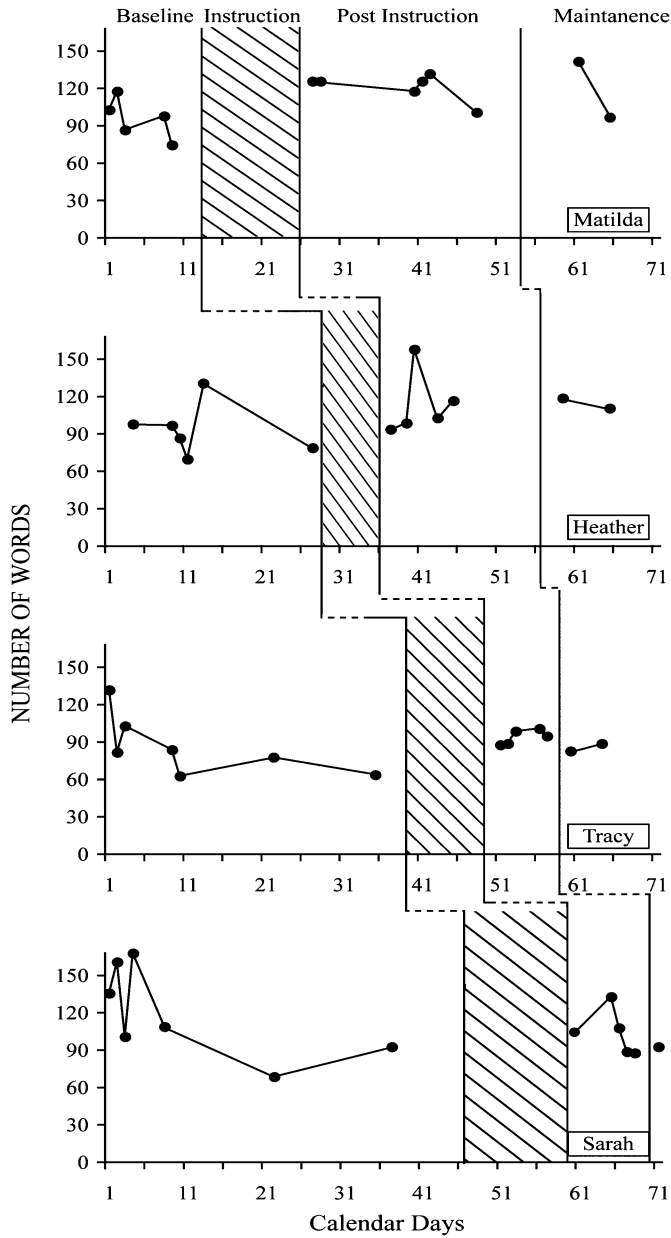


FIGURE 2 The number of words written for each 10-minute persuasive quick write.

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trend from her baseline performance. Her gains in response parts in this phase showing a two response part growth (7 to 9 response parts) compared to baseline. The level from baseline to post instruction also showed an increase.

During the maintenance phase, Matilda demonstrated a rapidly increasing trend to 12 response parts, which was an increase of three parts from her highest post instruction data point. However, her second maintenance point dropped to 8 response parts, which was below the desired criteria of 10 response parts.

Heather had a rapidly decreasing trend before stabilizing her number of response parts during baseline. Her initial baseline data point had nine response parts with her remaining baseline data points ranging from three to five response parts. Heather's postinstruction performance demonstrated a moderately increasing trend from baseline: a consistent range of 8 to 10 parts compared to a range of 4 to 9 parts. The level was also higher in postinstruction when compared to baseline. Heather exhibited high-level stability in response parts during the maintenance phase writing 10 parts for both maintenance data points.

Tracy's baseline showed a rapidly decreasing trend before exhibiting a low level of stability in number of response parts. Her initial baseline data point had nine response parts and ultimately her final baseline data point ended at three response parts. Tracy's postinstruction and maintenance performance did not reach the 10-point criteria. However, she demonstrated less variability in response parts than during baseline. Additionally, Tracy had a rapid increase in number of parts at the end of the postinstruction phase. Her postinstruction response part scores consistently ranged from five to eight parts. Tracy's highest number of response parts was found in her final postinstructional data point, which had eight response parts. This was a moderate increasing trend from her baseline performance in response parts, which ranged from three to nine parts. There was also a slight level of change upward from baseline to postinstruction. Tracy's maintenance performance demonstrated high stability with eight response parts for each of the two data points.

Sarah's baseline performance had a decreasing trend and showed much stability in the last four data points. Overall, Sarah had the most stability in her baseline performance when compared to the other participants. During postinstruction, Sarah's performance demonstrated a high level variability in the number of response parts but also showed a sharp rise in level. She had a rapidly increasing trend in number of response parts followed by a rapidly decreasing trend at the end of the postinstruction phase of this study. Sarah only had one maintenance data point due to the school year ending. She ended with an increase from her final postinstruction data point and had 10 response parts.

*Number of words.* The number of words was calculated using the word count feature of the Microsoft Office Word 2007 program. The number of words was also verified through a manual counting of the words by the scorers. The number of words in the 10-minute persuasive quick writing showed high levels of variability during all phases for all participants.

During baseline, Matilda had a rapidly decreasing stable trend in number of words. Her number of words ranged from 75 to 118 words. During postinstruction, Matilda showed an immediate jump up in level but over time her trend started to decline. Four of the postinstruction data points were above baseline while two of the data points dropped back to the baseline level. The postinstruction phase showed the most stability for Matilda in terms of number of words. During the maintenance phase she had a high performance, which then dropped but was in

line with her baseline and postinstruction scores; however, her first score of 142 words was the highest in all phases.

Heather's number of words showed a high level of variability when studying baseline. Her number of words showed a rapid decrease followed by a rapid increase before a second rapid decrease in the number of words. Heather's baseline ranged from 79 to 131 words but overall showed a declining trend. Heather's range of words during postinstruction increased from 94 to 158 words. Her postinstruction performance appears similar to her baseline performance in that it was highly variable with a rapidly increasing trend followed by a rapidly decreasing trend. During postinstruction there was an overall increasing trend. However, treating the third postinstruction point as an outlier would then mean Heather has four data points that steadily rise. As she moved to the maintenance phase, Heather had two data points that were very similar to one another, 119 and 111 words.

Tracy exhibited a high level of variability during baseline but did show a stabilizing declining trend during the last four data points. After instruction, Tracy's number of words during postinstruction had a high level of stability. The number of words in postinstruction ranged from 88 to 101 words. This range fell within her baseline range of 63 to 132 words indicating there was no overall change in the number of words produced. However, her word count range did become smaller indicating stability in the number of words. Her first and second postinstruction data points were highly stable, 83 and 89 words. During the maintenance phase, she demonstrated high stability as her number of words dropped slightly to 83 and 89 words for the two data points. This level of postinstruction and maintenance were slightly higher than her last four data points in baseline, although all fall within the range of her word count during the beginning of baseline.

During baseline for number of words, Sarah showed a high level of variability. Her first baseline data point had 136 words and varied from a high of 168 to a low of 69 words. Overall, however, a flat trend can be shown when drawing a line through all of her data points. Even though Sarah had a high degree of variability, the presence of a flat trend was the main factor in a decision to move her to the instruction phase.

After instruction, Sarah's number of words again demonstrated variability during postinstruction but to a lessened degree. Her post instruction range was 88 to 133 words compared to her baseline of 69 to 168 words. Sarah only had one maintenance data point which occurred at the level of her last two postinstruction performances.

*Social validity.* An open-ended question interview given at the conclusion of the study was used to assess social validity of the SRSD for POW+TREE for persuasive quick writes. All four participants viewed the intervention favorably. Tracy stated, "It made my thinking more organized by using an organization map to organize my thoughts." Heather said, "It helped me become a better writer. It got me thinking about how to organize my thoughts and work faster than when I started." Matilda and Sarah both felt they had a better understanding of how to write to a persuasive prompt using "all the parts" and "writing better." All four participants felt other students would benefit from the strategy by learning how to organize their thoughts better in order to become a better writer. Tracy would have liked more modeling with the conclusion portion of the strategy but stated, "The lessons were good and easy to learn because the mnemonics are easy to learn." Matilda would like the SRSD for POW+TREE "added to the curriculum so that other students will learn it." She was also pleased to report that she used the

strategy during the recent state assessment. Finally, all four participants stated the organizational map helped them to list the reasons they needed to support their ideas and organize their writing.

## DISCUSSION

Communicating in writing is a critical skill that assists adolescents with achieving academic success. When a student demonstrates writing skills below the proficient level, they are at risk for academic failure. Establishing effective written communication skills will help adolescent students not only in the academic setting but also in the work environment (Graham & Perin, 2007a). Students with LD have difficulty writing, especially with planning, organizing, and expressing their ideas in a coherent manner. Despite these difficulties, students with LD overestimate their ability to communicate effectively in writing. As a result, students with LD may perceive they are expressing their ideas effectively when in reality they are not (Harris et al., 2003).

The purpose of this study was to help students with LD at the high school level become better writers and systematically extend and replicate the research base of the SRSD for POW+TREE on persuasive quick writes. The quick writes were analyzed for improvements in number of response parts and number of words written. Furthermore, the acceptability of SRSD by high school students with LD was evaluated. In particular, this study replicated, at the high school level with students with LD, the research of Mason and colleagues (2010) as well as Hoover (2010) who investigated the effects of SRSD for POW+TREE with middle and high school students with ED.

The results of this study indicate that SRSD for POW+TREE improved the number of response parts in 10-minute persuasive quick writes for the four high school participants with LD. Prior to the intervention, as a group, three of the participants (Heather, Tracy, and Sarah) showed a low level of stability in the number of response parts during the baseline phase (range 3–9 parts). Conversely, Matilda demonstrated a low level of variability at the baseline level. In addition, the four participants demonstrated decreasing trends in the number of response parts during baseline. These results would be expected in the absence of instruction. After instruction, the postinstruction phase showed three of the students (i.e., Matilda, Heather, and Sarah) had an increasing trend and higher range of response. Each improvement comported with the systematic application of the intervention as directed by the multiple baseline design. And while Tracy's response parts were not higher than her baseline, her data show an increasing trend and more stability. The improvement in response parts for all students is similar to the results found in previous studies of students with ED (Mason et al., 2010; Hoover, 2010).

Individually, three of the participants (Matilda, Heather, and Sarah) in this study, as in previous studies (Hoover, 2010; Mason et al., 2010), maintained an increase in number of response parts at the conclusion of the intervention. The replication of the improvements in the number of response parts for Matilda, Heather, and Sarah indicates that the SRSD for POW+TREE for 10-minute persuasive quick writes for high school students with LD is an effective intervention. Also, the results in number of response parts for Matilda, Heather, and Sarah reflect their classroom performance, as writing is a preferred activity for all three students. Thus, they demonstrated desire to improve their writing throughout the study in order to improve their writing skills.

The third participant, Tracy, remained within her baseline range of response parts after the intervention concluded. While Tracy's overall range of response parts remained within the baseline range even after the intervention period, she was demonstrating a stable increasing trend, which may have continued if given additional instruction and/or postinstruction prompts. On the other hand, her lack of improvement could be a result of her perception that her writing performance was better than her actual writing. An inflated sense of academic achievement/ability is a trait of students with LD (Harris et al., 2003). Tracy's performance is consistent with her classroom performance where she had been observed doing minimal work to complete assigned tasks.

Tracy's performance in the number of response parts is similar to the results found in previous research with students with ED (Mason et al., 2009). In the Mason and associates (2009) study, students with ED did not meet the desired eight-point criteria during postinstruction but demonstrated a stable level of response parts with an increasing trend at the end of postinstruction. Based on this trend, it could be surmised that with additional instruction, including modeling the strategy more, it is possible that Tracy would have reached the eight-point criterion in terms of response parts. This further demonstrates that high school students with LD have a need for and respond to direct, explicit, systematic instruction in order to improve their academic performance (Graham & Perin, 2007a, 2007b).

High school students, including students with LD, may be required to write proficiently on the state assessment testing as a graduation requirement (Katsiyannis, Zhang, Ryan, & Jones, 2007; Schumaker & Deshler, 2003), as has been implemented in the high school where this study was conducted. Additionally, one of the main assessment tools used to determine knowledge at the secondary level is the ability to express and support concepts and ideas in writing (Christenson et al., 1989; Graham & Leone, 1987). Teaching high school students with LD to organize their thoughts to support a specific position is important not only in terms of their classroom performance and assessment but also in terms of being able to create proficient responses to prompts in state standardized testing (Schumaker & Deshler, 2003). Providing students, especially those with LD, with a strategy such as SRSD for POW+TREE will potentially increase their chances at success in regards to writing coherently.

The results in the number of words written were variable for all participants at the conclusion of the study. Participants did not exceed their baseline performance consistently during the postinstruction or maintenance phases of the study. The improvement in number of words for Matilda and Heather would suggest that SRSD for POW+TREE for persuasive quick writes instruction was effective in producing a higher number of words written. However, for Tracy and Sarah, the number of words written at the conclusion of the study remained within the baseline range. The results in the number of words differed than that found in previous research. When given SRSD instruction for POW+TREE middle and high school students with ED improved their number of words (Hoover, 2010; Mason et al., 2010, 2009) from baseline to postinstruction. The difference in the progress in the number of words at the postinstruction phase could be attributed to the higher baselines found with students with LD. The participants in this study had higher baseline levels than participants with ED in previous studies (Hoover, 2010; Mason et al., 2009, 2010).

Also different from previous studies (Hoover, 2010; Mason et al., 2009, 2010) was the stability found in the number of words for the current study. While there was not a consistent increase in the number of words written, the participants in the current study demonstrated stability in the overall number of words written at the conclusion of the intervention. The



stability in word count suggests that the participants in this study were able to generate their ideas in a concise and more consistent manner. While the number of response parts increased, the number of words stayed the same suggesting that the participants were able to organize and present their ideas without the need for additional words. The term fluency refers to a behavior performed with accuracy and speed, or an appropriate pace (Binder, 1996, 2005). The data suggest the participants may have started to become fluent, which would account for the more consistent writing even though the overall production did not increase. Future studies examining the quality of student responses changing without additional production as evidence for a change in fluency of writing.

A unique feature of this study is the implementation of the 10-minute quick write factor in addition to the SRSD for POW+TREE instruction. The time factor is important as there are circumstances where high school students with LD are required to express their thoughts in writing within a given time frame (i.e., length of a class period or a portion of a class period). In relation to quick writing, students are given a brief period of time (i.e., 10 minutes) to clearly answer a specific question and/or defend their opinion. This time limit was found in previous research (Hoover, 2010; Mason, et al., 2009, 2010) with students at the high school and middle school level with ED. However, this study is the first one that investigated the results of SRSD for POW+TREE for 10-minute persuasive quick writes for high school students with LD. The results of this study in both terms of response parts and number of words shows that the SRSD for POW+TREE has the potential to assist high school students with LD in being able to adequately address a specific prompt in an organized manner as demonstrated through the participants increase in the number of response parts and their stability in the number of words written.

Participant interest in the writing prompts presented also varied. Participants were given two prompts to choose from for each data point, but were not always interested in the topics. When presented with topics in which they were not interested, the participants would ask if they could have a different prompt. Conversely, when presented with a prompt about which they felt strongly, the participants would share their excitement through statements such as “I know a lot about this” or “I have a strong opinion about this topic.” However, due to counterbalancing prompts across phases, interest should have little effect on findings. The reaction of the participants to the given prompts was similar to the responses of high school students with ED in the Hoover (2010) study. The participants in that study also stated preferences and dislikes for given prompts.

SRSD for POW+TREE intervention was deemed an acceptable and useful intervention to the participants of this study. The participants self-reported, through the use of an interview, that the strategy assisted them with organizing their thoughts prior to writing. Matilda, Tracy, and Heather specifically found the POW+TREE graphic organizer useful. Even after the printed organizer was no longer available to them, they recreated it in their notebook prior to writing their postinstruction prompts. Sarah stated the strategy helped her “know what to write and how to write better.” All participants believed other students would benefit from this strategy; with Matilda specifically stating the strategy should become “part of the curriculum so other students can learn it.” Similar results were found in the Hoover (2010) and Mason and colleagues (2010) studies. However, in the Mason and colleagues study, participants reported losing homework time during the school day to be a downside of the intervention, whereas the participants in the current study did not mention coming in before school or staying after school as a deterrent to learning the strategy.

## Limitations

One limitation of this study was that the principal investigator knew all participants in the study and was their primary instructor in language arts during the course of this study. The participants were all aware of the principal investigator's ongoing course of study and her requirements as they were cited in general terms during class as an example that being too busy was not an excuse to not have homework done. As a result, the participants were very motivated to help the principal investigator successfully complete her graduation requirements. Additionally, during the course of this study, Heather stopped attending school for two weeks. She was considering dropping out of school due to her nongraduating status. After a meeting with her assistant principal, guidance counselor, and the principal investigator she made the decision to return to school. Upon her return, she spent a significant amount of time before and after school with the principal investigator to catch up on her work. Another limitation involved Tracy's social issues. After a cafeteria incident, she was suspended for five days. After this suspension, Tracy considered completing her senior year at home, which caused her attendance issues. Finally, in relation to participant limitations, Matilda had emergency surgery during the postinstruction phase. Her absence caused a longer time period between instruction and postinstruction and a change in the setting of the data collection. She completed several prompts during home visits with the principal investigator who was also her homebound instructor.

## Future Research

This is the first study using SRSD for POW+TREE for persuasive quick writes exclusively with participants with LD at the high school level. While research has demonstrated the effectiveness of SRSD for POW+TREE for persuasive quick writes with participants with ED at the middle and high school levels (Hoover, 2010; Mason et al., 2009, 2010) additional research is needed to further determine and support the effect of SRSD for POW+TREE for students with LD at the high school level. Researching the effectiveness of this strategy could also help increase the amount of academic time engaged in writing tasks. In an observational study of academic writing time in special education classrooms, Christenson and associates (1989) found that students in special education studies spend less than 10% of their total academic time engaged in writing tasks. The lack of academic time spent on writing could impede the academic advancement of students with LD at the high school level, as writing is the primary means for students with LD at the secondary level to demonstrate their knowledge (Graham & Leone, 1987).

## Implications for Practice

This study demonstrates the use of SRSD for POW+TREE for persuasive quick writes can be taught to and learned by high school students with LD. The time involved in teaching this strategy is minimal and could be incorporated into existing writing curriculums for students with LD. Essentially, this strategy requires five 30-minute lessons as well as five 10-minute follow-up quick writes. Follow-up lessons consisted of two 10-minute prompts. While some students may require additional instructional lesson, such as Matilda did in this study, the amount of time involved in teaching and maintaining this strategy would fit into the traditional 50-minute

class period found at most high schools. Furthermore, the developers of SRSD designed the instruction of the strategy to be used in an ongoing manner across settings. Therefore, teachers could plan for refresher lessons throughout the year, as assigned tasks would benefit from the strategy application. These refresher lessons could be incorporated into the normal routines of the classroom, which would help to promote generalization of the strategy.

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