The Effectiveness of an SRSD Writing Intervention for Students with Epilepsy

by

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B.Ed., Queen's University, 2008
B.Sc., University of Victoria, 2006

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Supervisory Committee

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Abstract

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The current study investigated the efficacy of using a writing intervention based in the self-regulated strategy development (SRSD) approach for teaching paragraph writing skills to three students with epilepsy who struggled with writing. Individuals with epilepsy often have difficulties with the same cognitive processes that are involved in the writing process such as attention, working memory, and self-regulation. The study used a multiple baseline approach and participants' paragraphs were examined across the following WIAT-II paragraph scoring domains: number of words written, mechanics, organization, vocabulary, and total paragraph score. Effects on participants' self-efficacy beliefs towards paragraph writing were also examined.

Results revealed an improvement in number of words written, paragraph organization, overall writing quality, and self-efficacy towards writing for all participants following the ten week intervention. Limitations to the study and implications for educators are discussed.

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Dedication

To my husband, Andrew, who supported me throughout this entire process and who keeps pushing me to be the best person I can.

Introduction

With an estimated prevalence rate of 4-5/1,000, epilepsy is one of the most common neurological disorders in childhood and adolescence and affects multiple areas of a child's life, including their cognitive functioning, educational achievements, and family and peer relationships (Jalava, Sillanpaa, & Camfield et al., 1997). Students with epilepsy have unique learning needs and many are falling through the cracks in our education system. Several studies have shown that students with epilepsy are more likely to require special educational help, to have below average academic performance, and to repeat a grade (Wirrel et al., 1997; Aldenkamp, 1994). It is important to determine the best way to teach to these students' strengths so that they may reach their full academic potential. Very little research has been done examining the effectiveness of academic interventions with this population and many teachers may be unaware of the unique learning needs these students have. Writing in particular is a crucial area of need because as students progress through school they are expected to demonstrate much of their learning through written work (e.g., the shift from "writing to learn" to "learning to write"; Juzwik et al., 2006). Indeed, writing is becoming an "economic imperative" as our society becomes increasingly more reliant on print-based media (Juzwik et al., 2006).

Research has linked many cognitive processes such as phonological processing (e.g., the ability to manipulate the sounds in oral language), orthographic coding (e.g., the ability to use familiar orthographic sequences to access the lexicon without phonological mediation) and the rapid naming of letters to the development of writing. Other important processes involved with writing include attention (e.g., the ability to initiate, sustain, and shift attention while writing), working memory (e.g., the ability to hold and

manipulate information in short-term memory) and self-regulation (e.g., the thoughts, feelings, and actions that writers use to maintain their focus throughout the writing process in order to attain their writing goals) (Berninger & Richards, 2002; Thomson et al., 2005). Cognitive impairment has been shown to be a frequently occurring consequence of epilepsy, either as a result of medications or of the seizures themselves. The most commonly reported problems include memory impairments, attention deficits, and executive functioning difficulties (e.g. difficulties with initiation, planning, organization, self-monitoring and self-regulation; Tromp, Weber, Aldenkamp, Arends, Linden, & Diepman, 2003).

Self-Regulated Strategy Development (SRSD) interventions have been shown through several meta-analyses to be an effective way to improve students' writing (Graham & Harris, 2003; Graham & Perin, 2007; Rogers & Graham, 2008; Baker et al. 2009). SRSD was developed by Harris and Graham (1992) and is based on cognitive behavioural modification. SRSD teaches the strategies needed to complete a writing task, enhances self-regulation through goal setting and self-monitoring, improves content knowledge by focusing on what students need to write about, and improves motivation and self-efficacy. This type of intervention is designed to promote students' ownership of their work and independent use of writing strategies (Lane et al. 2008).

Students with epilepsy often have distinct cognitive profiles that put them at risk for developing writing problems, as many of the cognitive processes involved in writing are exactly those that individuals with epilepsy may have difficulty with. Despite this, there has been very little research done examining the development of writing in this population and even less examining how to appropriately intervene when writing

difficulties are present. Teachers need to know what methods work best when teaching writing to students with epilepsy so that fewer of these students will go on to require special educational services.

The current study

The purpose of this study is twofold. First, this research will examine the effectiveness of a writing intervention based on the Self-Regulated Strategy Development (SRSD) approach for improving the paragraph writing ability of students with epilepsy. Second, this research will examine the effect the SRSD writing intervention has on participants' self-efficacy beliefs towards paragraph writing.

There is little research addressing writing specifically in students with epilepsy, despite the research that shows these students often struggle with this task. As teachers may not be aware of the learning needs of this population, this research provides valuable information about the usefulness of this particular academic intervention for this population.

Definition of Terms

Epilepsy – a group of neurological disorders characterized by seizures.

Self-efficacy - an individual's beliefs and personal judgments about their ability to perform certain tasks, established through normative criteria.

Self-regulation – the process by which students activate and sustain cognitions, behaviors and affects, which are systematically oriented toward attainment of their goals

Self-regulated strategy development - an intervention based on cognitive behavior modification, verbal self-regulation, self-control, and learning strategies research

Literature Review

Epilepsy is one of the most common neurological disorders in childhood and adolescence. Despite this, a diagnosis of epilepsy may carry a social stigma and has been shown to affect children and their families physically, psychologically, and financially (Johnston & Smith, 2008). This disorder affects multiple areas of a child's life including their cognitive function, educational achievements, and family and peer relationships (Jalava, Sillanpaa, & Camfield et al., 1997). Most causes of epilepsy have their onset in childhood, a time when the child is learning crucial skills that are important for their development and long term success. It is therefore critical to have a full understanding of the academic impacts this disorder has on the developing child in order to help them achieve their full potential.

Epilepsy: Clinical Features

Epilepsy is a group of neurological disorders characterized by seizures, which are sudden episodes of disturbed behavior, emotion, sensory or motor function that may be accompanied by a change in consciousness level (Johnston & Smith, 2008). They occur because of abnormal, excessive discharge from cerebral neurons and are classified based on the pattern of this discharge (Johnson & Smith, 2008). The diagnosis of epilepsy is a clinical one and relies on accurate personal and eyewitness accounts. In Canada, 75-80% of people diagnosed with epilepsy are under the age of 18, with 55% of them being under the age of 10 (Camfield et al., 1996). Known causes of epilepsy include traumatic brain injury, central nervous system infections, developmental disabilities (such as intellectual disabilities or cerebral palsy), and perinatal factors (Annegers, Walter, Rocca, & Hauser,

1996). Despite this knowledge, the cause of approximately 70% of all cases of epilepsy remains unknown.

Effects on cognitive functioning.

The effects of epilepsy are felt in many areas of a pre-adolescent's life. A study by Arunkumar and colleagues (2000) found that the second most common concern of children and adolescents living with epilepsy was the cognitive effects of epilepsy. Cognitive impairment has been shown to be a frequently occurring consequence of epilepsy, with the most commonly reported problems being memory impairments, mental slowing, and attention deficits (Tromp, Weber, Aldenkamp, Arends, Linden & Diepman, 2003). Deficits in language have also been reported in word fluency (Henkin et al., 2005) and phonological awareness (Northcott et al., 2005, 2007). Not all research has yielded the same results, however, as Pavone and colleagues (2001) found verbal memory and language functions to be similar to controls. As epilepsy is not a specific disorder, but a group of neurologically similar disorders, there is no single pattern of neuropsychological impairment in childhood epilepsy (Williams, Griebel & Dykman, 1998). Williams and colleagues (1998) found no significant differences between seizure type and neurological effect, suggesting that epilepsy has a diffuse, generalized effect on cognitive functioning regardless of type of epilepsy.

Effects on academic achievement.

The specific cognitive impairments associated with epilepsy place students at a higher risk for academic difficulties. Children with epilepsy are at a much higher risk for academic failure, even in comparison to children with other chronic health conditions

(Austin, Huberty, Huster, & Dunn, 1998; Westbrook, Silver, Coupey, & Shinnar, 1991). Williams and colleagues (1998) found that seizure type was not related to achievement, but poor seizure control was significantly related to lower reading achievement, attention difficulties and social withdrawal. Students with epilepsy have been shown to be more likely than same aged peers to: (a) receive academic help, (b) have below average academic performance, and (c) have repeated a grade (Wirrel et al. 1997). Research continues to show that the academic performance of students with epilepsy is poorer than would be expected by their intellectual ability (Austin et al. 1998; Seidenberg, 1986; Wirrel et al. 1997). A recent large scale study by Fastenau and colleagues (2008) showed that by using the IQ-achievement discrepancy definition, 48% of the students with epilepsy exceeded the cut-off for a learning disorder in at least one academic area, while 62% of the students exceeded a "low achievement cut-off". The most common learning difficulty was found to be in writing (38%), followed by math (20%), and reading (13%).

Among demographic variables studied in relation to epilepsy and school achievement, the age of the student has been shown to be related to academic performance. Older children have been found to be further behind in their academic achievement levels compared with younger children with epilepsy (Seidenberg et al., 1986). This is crucial information for teachers since early interventions for writing are more likely to result in improved performance (Abbott, Reed, Abbott, & Berninger, 1997; Berninger, Vaughan et al., 1998).

Writing

Writing is a crucial skill to master and is incorporated into all aspects of our society. Writing makes it possible to gather, preserve, and transmit information and it is

an important means of self-expression (MacArthur, Graham, & Fitzgerald, 2006). Writing is not a simple skill, but is a dynamic process in which the writer must simultaneously coordinate various processes, from lower level text-based skills to higher order self-regulation strategies (Hayes & Flower, 1980).

Theories of writing.

Views on writing have shifted from a product oriented perspective, which focuses on the written product students produce, to a process oriented perspective, in which researchers attempt to understand what students do when they write (Hayes & Flower, 1986). Understanding the cognitive processes involved in the writing process allows us to help struggling writers who may be experiencing challenges due to weaknesses in certain cognitive areas. One of the most influential models of cognitive processes in skilled writing is Hayes and Flower's 1980 model of writing (Berninger, 2009). Three main processes are described in Flower and Hayes' model: planning, translating, and revising. This model has subsequently been modified by Berninger and Fuller (1996) to describe the processes that younger children go through when they write.

A process model of writing development.

Planning. Planning is the generation of organizational schemes and goals (Berninger & Fuller, 1996). Within the planning process, the ways that individuals represent their knowledge is diverse: some knowledge may be stored as language, some as meanings, and some is stored as images or skills that may be more difficult to translate into language (Hayes & Flower, 1986). Strategic knowledge is important in the planning process. This includes knowing how to define the writing process and having a large

body of procedural knowledge on which to draw (Hayes & Flower, 1986). As students read texts and listen to texts read by others, they may internalize the features of quality writing and use these in their own writing (Calkins, 1994). McEvleen and Dierking (2000) discuss the importance of using such mentor texts in developing writing skills. Using this literature creates a model from which students can frame their own work, and appropriate, relevant literature can help engage students and motivate them to read and write (McEvleen & Dierking, 2000). Being able to monitor and direct one's writing progress is an important skill good writers have and draws heavily on executive functioning processes such as initiation, planning, organization, self-monitoring and self-regulation (Hayes & Flower, 1986; Semrud-Clikeman & Harder, 2011).

Self-regulation has been defined by Schunk and Zimmerman (1994) as the ''process whereby students activate and sustain cognitions, behaviors and affects, which are systematically oriented toward attainment of their goals'' (p. 309). Students who are self-regulated take an active role in their learning, while students who have low self-regulation are frequently low-achieving (Zimmerman & Risemberg, 1997). Self-regulated learners use meta-cognitive, behavioural, and motivational strategies to optimize their learning (Schunk & Zimmerman, 1994).

According to Winne and Hadwin (1998), self-regulated learning occurs through four recursive phases: task understanding, goal setting and planning, task enactment, and small and large scale adaptations. Learners create their own interpretations of academic tasks based on their beliefs as well as self and social contexts (Winne & Hadwin, 1998). Appropriate task perceptions are crucial in the writing process. Writers need to understand both the explicit aspects of the writing task, such as the instructions, length,

and questions to be answered, as well as the implicit aspects of the task, such as audience, style, and genre. Self-regulated learners then use these task interpretations to construct goals for themselves and plan a course of action. These goals are also used to evaluate progress and performance as the individual completes the task. Self-regulated learners then use meta-cognitive strategies to self-monitor, set goals, and judge their progress. Creating appropriate goals is a critical step in self-regulated learning since this creates self-defined standards that learners use to judge both their progress and how successful they will be in achieving their goals (Winne & Hadwin, 1998). Prior experience has a direct impact on future goal setting and confidence in the ability to achieve one's goals.

Younger writers are less likely than older, more skilled writers to use effective strategies in searching their memories for content, to use goals to direct the planning process, and to use knowledge of text structure in their writing (MacArthur, Harris, & Graham, 1994). Students with and without a learning disability (LD) in elementary school devote little time to pre-planning, and instead plan while they write (MacArthur, Harris, & Graham, 1994; Berninger, Fuller, & Whitaker, 1996). Strategies that have been shown to help students with LD in the planning process include brainstorming ideas, generating and organizing content with text structure prompts, and setting planning goals for the writing process (Troia, Graham, & Harris, 1999).

Translation. Translation is the process of turning the writing plan generated in the planning process into written form and requires a great deal of work (Kaufer, Hayes & Flower, 1986). Berninger, Fuller, and Whitaker (1996) break translation into two distinct parts: (1) text generation and (2) transcription. Text generation is the transformation of ideas into language in working memory (e.g., the formation of words, sentences, and

text). This process draws on working memory (Kellogg, 2001), orthographic processing (Berninger, Yates, & Lester, 1991) and phonological processing (Wolf & Bowers, 1999).

Working memory is the ability to hold and manipulate information in short-term memory, and is limited in the amount of material it can hold and the length of time it can hold it. Research examining the effect of epilepsy on memory has been mixed, as some studies have found children with epilepsy to exhibit working memory difficulties (Bailet & Turk, 2000; Schouten et al., 2002; Williams & Sharp, 2000) while others have failed to find a correlation between the two (Williams et al., 2001; Borden, Burns, & O'Leary, 2006). Some research has shown that memory impairments depend on the type of epilepsy, with children with childhood absence epilepsy less affected than those with temporal lobe epilepsy (Nolan et al., 2004). Research has demonstrated that children with learning disabilities in the areas of reading and writing have significant working memory problems (Swanson, 1999; Swanson & Ashbaker, 2000).

Orthographic coding is the ability to "use familiar orthographic sequences to access the lexicon without phonological mediation" (Stanovich, 1986). One function of an orthographic processor is to create a representation of a word in memory (Ehri & Wilce, 1980). Olsen and colleagues (1989) designed a task where participants select the real word in a real word/non-word pair (e.g., rain/rane). Both stimuli are phonologically identical so the participant must use the orthographic representation of the word they have in memory. Orthographic skills for coding whole-word and letter units are related to both reading and writing acquisition in the primary grades (Berninger, Yates, & Lester, 1991; Berninger et al., 1994). Orthographic skills have been shown to be related to exposure to print (Cunningham & Stanovich, 1990) and interventions designed to

improve whole word coding and letter coding have shown significant individual and group improvement in word recognition skills (Berninger & Traweek, 1991).

Phonological processing refers to how we use the sounds of our language, or phonological information, to process oral and written language (Wagner & Torgesen, 1987). Phonological processing theory includes three separate but highly correlated factors: phonological awareness, phonological memory, and lexical access (Logan, Schatschneider, & Wagner, 2011), and has been shown to be highly predictive of both reading and spelling success (Wolf & Bowers, 1999). Several studies have linked epilepsy with phonological processing difficulties (Vanasse, Beland, Jambaque, Lavoie & Lassonde, 2003; Northcott et al., 2005, 2006). Northcott and colleagues (2005) examined the neuropsychological and language profiles of children with epilepsy (n = 2,250). In addition to evaluating IQ, memory, executive functioning and academic achievement, five subtests from the Queensland University Inventory of Literacy were also administered to evaluate phonological awareness. The sample of children with epilepsy scored significantly lower compared to aged based norms on measures assessing non-word spelling, non-word reading, visual rhyme detection and phoneme manipulation, all important processes in reading and spelling.

Transcription is the transformation of language into written symbols. Transcription includes processes such as handwriting fluency (Just & Carpenter, 1992; De La Paz & Graham, 1997), spelling (Berninger, 2002) and rapid naming (Savage & Frederickson, 2006; Berninger et al., 2006). Handwriting requires the integration of orthographic knowledge and fine motor skills to form letters on a page (Christensen, 2005). It has been shown that when lower level writing processes, such as handwriting,

are not fully automated the higher level writing processes, including idea generation, planning, and revision, are compromised (Just & Carpenter, 1992). Individuals are only able to consciously attend to a limited number of items at any one time as cognitive resources are limited (Sweller, 1988). When writing, individuals can manage this cognitive load by either automating the sub-components of the task or sequencing the activities so that attention may be focused on only one aspect at a time. According to La Berge and Samuels (1974), automaticity is the execution of cognitive tasks quickly, accurately, efficiently, and without the need for attention. In order to create high quality writing, an individual must be able to produce letters, words, and sentences automatically. If this automaticity has not been obtained, then cognitive resources that could otherwise be used for higher level processes are used simply to facilitate getting words down on the page. Spelling is an important component of transcription that often competes with cognitive resources that could otherwise be used in higher order processes, such as planning and organization (Gregg, Hoy, & Sabol, 1988). Written expression difficulties may arise from the inability to spell the words one needs to express one's ideas (Berninger et al., 2002). Spelling is a phonologic to orthographic translation, in which phonemes correspond to functional spelling units (Berninger et al., 2002). Papavasiliou et al. (2005) examined the written language skills in children (7-16 years) with benign childhood epilepsy. Children with epilepsy performed significantly worse than controls on a spelling test, an oral reading test and the Bangor Dyslexia test. Berninger and colleagues (2002) examined the effects of teaching either spelling or composition in isolation compared with teaching them in combination on the spelling and written expression performance of 96 grade three students. Only the combined treatment

group of spelling and composing instruction resulted in increases in both spelling and composition performance.

Several studies have shown a significant relationship between rapid naming tasks and reading ability (Aarnoutse, van Leeuwe, & Verhoeven, 2005; Wolf, 1991). A common measure of rapid naming is the rapid autonomized naming (RAN) task, in which participants are asked to identify different stimuli (letters, digits, colours, or shapes) repeated at random (Denckla & Rudel, 1974). RAN has been shown to be highly related to reading fluency, with the identification of letters and numbers more predictive of reading fluency than the rapid naming of either colours or shapes (Denckla & Rudel, 1974). The *RAN/RAS: Rapid Automatized Naming and Rapid Alternating Stimulus Tests* were developed by Wolfe and Denckla (2005) and estimate an individual's ability to recognize a visual symbol such as a letter or colour and name it quickly. There has been considerably less research examining the relationship between RAN and written expression. Research by Savage and Frederickson (2006) has shown a small relationship between RAN and spelling skills independent of phonological processing. Results showed below average readers and spellers performed significantly lower on rhyme detection, pseudoword decoding, and rapid digit naming tasks. RAN tasks only differed between the two groups when digits, not pictures, were used, providing more evidence that it is only the rapid naming of digits and numbers that have effects on reading and spelling (Savage & Frederickson, 2006). The speed at which an individual is able to retrieve letter names thus has an impact on their ability to spell words and therefore affects the quality of their writing.

The Rapid Alternating Stimulus test (RAS), developed by Wolfe (1986), has been shown to be a better predictor of writing difficulties because it alternates from one stimulus set to another. On the first task letters and numbers alternate, while on the second, letters, numbers and colours alternate. Performance on the RAS task involves both controlled and automatic attention processes and has been shown to differentiate between average and impaired readers and writers (Albuquerque, 2012; Semrud-Clikeman, Guy, Griffin & Hynd, 2000;Wolfe, 1986). Given the difficulties with attention that individuals with epilepsy often display and the importance of this process to the writing task, each of these skills were assessed in the present study in relation to each child's writing performance.

While Hayes and Flower (1980) made no distinction between text generation and transcription, Berninger, Fuller and Whitaker (1996) found that these two components may develop at different rates within an individual. As transcription processes become automated, more cognitive capacity is available for text generation. Often compositions written by students with a learning disability of written expression have more spelling, capitalization, and punctuation errors than compositions written by their typically developing peers (Fulk & Stormont-Spurgin, 1995). When asked what constitutes good writing, students with LD often stress form over content more often (Graham, Schwartz, & MacArthur, 1993). These difficulties in lower level text production skills often disrupt a student's ability to engage in higher order composing behaviors like planning and revising (Graham, 1990).

Currently, computers are the most common accommodation offered to students with learning disabilities and when students use spell-checkers and programs such as

text-to-speech software, their difficulties with transcription processes may be reduced (Berninger, 2006). Morphy and Graham (2012) conducted a meta-analysis to examine how keyboarding impacted the writing quality of students in grades 1 through 12. The average effect sizes were positive and significantly different from zero for essays written by keyboard in quality (d = .52), length (d = .48), development and organization (d = .66), and mechanical correctness (d = .57). Interestingly, the effect sizes for vocabulary (d = .17*)* and grammar (d = .36) were not significantly different from zero. When viewed within Hayes and Flower's (1986) model of writing, computers may help ameliorate the difficulties an individual experiences with lower order transcription processes, but direct teaching of vocabulary and grammar will still be needed.

Students with an LD frequently generate less content and include more nonfunctional material in their writing (Graham, 1990; MacArthur & Graham, 1987). Teaching students with learning difficulties to establish goals concerning the length of their papers and to self monitor their output can thus increase the amount and quality of their writing (Harris et al., 1994).

Revision. Revision is the process of re-writing a text to improve it (Berninger, Fuller, & Whitaker, 1996). There are great differences in the amount of time spent on this process and both developing and skilled writers tend to make only surface changes (e.g. grammar or spelling changes) rather than changes in meaning (Hacker, Plumb, & Butterfield, 1994), and these minor revisions tend to have little impact on the quality of texts (Graham, MacArthur, & Schwartz, 1995). Young children are unlikely to revise spontaneously (Perfetti & McCutchen, 1987) but are more likely to revise if teachers encourage multiple drafts, provide opportunities to rewrite, and do not expect perfection the first time (Graves, 1983). Revision is a complex task. It requires that the individual

is able to understand the goals of the text, predict how well the text will accomplish those goals, and propose new ways to accomplish the goals if the individual believes the text to be problematic.

The role of executive functioning and self-regulation in writing.

Writing is a complex activity that requires the coordination of many cognitive processes. Executive functioning and self-regulation are crucial to the effective integration of these processes and are vital for effective writing. Executive functioning includes processes such as initiation, planning, organization, self-monitoring and self-regulation (Lezak, Howieson, Loring & Hannay, 2004). It was first discussed by Lezak (1983) who emphasized that cognitive abilities are dependent on the executive. Executive functions are control processes that affect output and have been linked to the prefrontal regions of the brain (Denckla, 1994). There have been several models of executive functioning that include factors such as planning, execution, self-regulation, maintenance, working memory and inhibition (Deaigneault, Braun & Whitaker, 1992; Welsh, Pennington & Groisser, 1991; Pennington, 1997).

Executive functioning has also been studied in children and adolescents with epilepsy and has been found to be an area of concern (Caplan et al. 2008). Children with epilepsy have been shown to score significantly lower on measures of planning, problem solving ability, verbal fluency (Croona, Kihlgren, Lundberg, Eeg-Olofsson & Eeg-Olofsson, 1999), response inhibition (Hermann et al., 2006; Pasacalicchio et al., 2007), cognitive speed, mental flexibility and cognitive interference (Pasacalicchio et al., 2007). As writing draws heavily on all of these processes, individuals with epilepsy may experience difficulty with the writing process.

Self-regulation within the context of writing refers to the thoughts, feelings, and actions writers use to maintain their focus throughout the writing process in order to attain writing goals (Zimmerman & Risemberg, 1997). Skilled writers are thought to have high self-regulation because composing is a task that is usually pre-planned and self-sustained (Zimmerman & Risemberg, 1997). Hayes and Flower (1980) discuss the importance of self-regulation in writing and state that an individual's ability to monitor and direct his or her writing progress is an important component of the writing process. A skilled writer is considering many different aspects of the writing process at once. They are examining their background knowledge about a topic, transforming these ideas into language, and transcribing this language into written form, while simultaneously considering what they know about text structure, their intended audience, and basic language and orthography. Self-regulatory processes include planning, monitoring, evaluating, and revising (Graham & Harris, 1993). The successful use of a planning strategy will also increase the likelihood that it will be used again in the future, and Graham and Harris (1989) suggest the continued success in using a particular strategy in writing will enhance an individual's self-efficacy in writing.

Understanding the different cognitive processes involved in writing and how they fit into Flower and Hayes' (1980) writing model allows both researchers and educators to determine why a particular student is struggling with writing, and to use interventions targeted to the individual student's areas of strength and weakness.

Self-efficacy and writing.

Self-efficacy is a construct that represents an individual's beliefs and personal judgments about their ability to perform certain tasks. These beliefs are established

through normative criteria rather than through comparison with others, and often affect students' choice of activities, their effort, and their performance (Bandura, 1986; Schunk & Swartz, 1993). Self-efficacy beliefs are formed in part from emotional and physiological reactions to the task and also from past experience, observations of others and verbal persuasion (Bandura, 1986). Beliefs about one's ability change with age, with younger children being more optimistic about their abilities (Anderman & Maehr, 1994). A study that compared students with epilepsy to those with either diabetes or controls found that students with epilepsy have significantly poorer self-concepts about their intellectual abilities and are twice as likely to report being worried about schools tests and when the teacher called on them (Matthews et al., 1982).

Self-efficacy for writing refers to an individual's perception about their ability to produce a certain type of text (Pajares & Johnson, 1993), and individuals with high self-efficacy for this task are often more willing to participate, work harder, and persist longer in tasks than individuals with lower self-efficacy about writing (Hidi & Boscolo, 2006). Children are able to see the relationship between performance, effort, and ability around the age of 10 (Nicholls, 1978). The task of writing becomes increasingly important as children progress through school, and children who begin to doubt their competence show less perseverance for difficult tasks around this age (Licht, 1992; Nicholls, 1978). Bandura (1986) hypothesized that the most powerful contributor to self-efficacy beliefs are one's own previous attainments, or *mastery experience*. When students believe their performance has been successful, their confidence that they can accomplish a similar task is increased. To a lesser extent, self-efficacy beliefs may also be formed through the *vicarious experience* of others performing the task. The use of mentor texts may therefore

increase an individual's belief that they too can perform the task (Pajares, Johnson & Usher, 2007). Considering how effortful the process of writing is, it is no surprise that there is a link between a person's self-efficacy regarding the writing process and their performance. Self-efficacy beliefs include the degree to which individuals believe they can control their level of performance and their environment, and therefore these beliefs affect an individual's motivation (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996). A study by Schunk and Swartz (1993) examined the relationship between 60 fifth grade students' writing self efficacy and their writing skills. Students were randomly assigned to four different treatments groups: product goal, process goal, process goal with progress feedback, and general goal. Students received 45 minutes of instruction over 20 days and all students were taught a strategy for writing paragraphs. All experimental conditions showed higher self-efficacy than the control group following the intervention. Similarly, all experimental conditions showed higher skill level following the intervention than the control group. The authors found that strategy use was positively correlated with self-efficacy, and that self-efficacy was highly predictive of both writing skill and strategy use in this population.

While the relationship between writing self-efficacy and writing achievement has been studied widely in the general population, little research has specifically examined this topic in students with epilepsy.

Writing interventions

There have been several meta-analyses examining writing intervention research. Graham and Harris (2003) conducted a meta-analysis that examined the effectiveness of teaching students strategies for planning, revising, and editing. They reported that

teaching strategies by the self-regulated strategy development (SRSD) model to students in grades three to eight resulted in a large average un-weighted effect size of 1.47 for writing quality. Graham (2006) examined writing instruction for students in grades two to ten and found that the magnitude of the effect size was related to the type of instruction. He found that instruction following the SRSD model had a higher effect size (1.57) than all other forms of strategy instruction combined (0.89). Self-regulated strategy development has thus been shown to be an effective mode of intervention for writing.

Self-regulated strategy development.

Much of the research examining writing interventions in the last few decades has looked at writing skills from a self-regulatory perspective. A key assumption of social cognitive theory is that people have the agency to create the circumstances and outcomes of their lives, and the way they do this is through their own cognitions and beliefs (Bandura, 1997). When engaged in self-regulated learning, individuals set goals based on their past experiences and current environment (Pintrich, 2000).

Harris and Graham (1992) developed the SRSD model based on cognitive behavior modification, verbal self regulation, self-control, and learning strategies research. This model contains six stages: (1) developing and activating prior knowledge (students are taught the background knowledge or skills they need to use the strategy effectively), (2) discussion of the strategy (students examine their current writing performance and discuss the purpose and benefits of the new strategy), (3) modeling of the strategy (the teacher models how to use the strategy and self-regulation techniques), (4) mastery/ memorization of the strategy (students memorize the steps of the strategy), (5) collaborative practice (students practice using the strategy with progressively less

scaffolding), and (6) independent practice (students use the strategy with little or no support).

SRSD fits well within Winne and Hadwin's (1998) theory of SRL. The intervention is aimed at improving students' understanding of what is expected in the writing process, and students learn to carry out specific composing processes such as planning and organizing. Students also develop the knowledge and self-regulating procedures needed to apply the writing strategies and to monitor their progress. SRSD is also aimed at improving students' motivation, including self-efficacy and effort (Lane, Harris, Graham, Weisenbach, Brindle, & Morphy, 2008). This type of intervention is designed to promote students' ownership of their work and independent use of writing strategies (Lane et al. 2008).

Milford and Harrison (2010) examined the impact of a self-regulated strategy development intervention on the paragraph writing and spelling achievement of an eleven year-old grade 6 student with a chronic illness. The PLEASE strategy was used in this intervention and involved the following steps: *P*ick the topic student wants to write about, *L*ist the ideas that might be included, *E*valuate the list for relevant ideas, *A*ctivate by choosing a topic sentence, *S*upply the list of ideas to generate sentences to support the topic sentence, and *E*nd with a concluding sentence. The intervention involved six one hour sessions. Spelling instruction occurred after the student generated text, as difficulty with the mechanics of writing (e.g. spelling) can interfere with the generation of content (Graham & Harris, 2003). Pre- and post- intervention measures included the paragraph writing and spelling sub-tests of the Wechsler Individual Achievement Test – Second Edition (WIAT-II; The Psychological Corporation, 2002). Ongoing curriculum based

assessments of the student's writing showed an increase in the number of supporting details included and the inclusion of a topic and concluding sentence in her paragraphs at the end of the intervention. At post-test, the student's performance on the paragraph writing subtest of the WIAT-II increased by 8 standard score points and the student was able to verbalize how she used the PLEASE strategy within her writing.

Self-regulated strategy development has been shown through several meta-analyses to improve the writing of students both with learning disabilities and without (Rogers & Graham, 2008; Graham & Perin, 2007). It specifically teaches students the three main processes in writing: planning, transcription, and revision, and teaches them to set goals and monitor their own progress. SRSD writing interventions have demonstrated improvement in participants' writing abilities in short time frames. Studies examining the effectiveness of SRSD writing interventions have used between six (Milford & Harrison, 2010; Wong et al., 2008) and twelve (Mason & Shriner, 2008) intervention sessions. Lieneman and Reid (2008) examined a SRSD intervention for improving the opinion writing skills of four grade four and five students. Using a mastery criterion based assessment, two of the students required only five sessions while the other two required eight to complete the intervention. SRSD works because it unites the cognitive and language based processes required of good writing.

Summary

Children with epilepsy have specific cognitive impairments that have been shown to put them at risk for academic difficulties (Tromp, et al., 2003; Henkin et al., 2005; Northcott et al., 2005, 2007). Since the particular cognitive impairments in executive functioning, attention, working memory and phonological processing are the same

cognitive processes highly involved in the writing process, children with epilepsy are at risk for developing writing difficulties. Considering the overlap between those cognitive processes important to writing and the cognitive processes often affected by epilepsy, it is surprising how little research has examined writing interventions for students with epilepsy. Of the research that has been done, most studies have focused on spelling (Fastenau et al., 2008; Papavasiliou, Mattheou, Bazigou, Kotsalis & Paraskevoulakos, 2005; Butterbaugh et al., 2004). By understanding the cognitive processes a student struggles with, educators can tailor their interventions to the strengths and challenges of their students. SRSD writing interventions provide explicit instruction in how to become self-regulated learners and target exactly those cognitive areas students with epilepsy often struggle with.

Children have been shown to accurately differentiate between performance, effort, and ability around the age of ten, and children who begin to doubt their competence begin to show less perseverance for difficult tasks at this age (Licht, 1992; Nicholls, 1978). SRSD writing interventions have been shown to improve the writing of students with learning disabilities (Santangelo, Harris & Graham, 2008; Welch, 1992), ADHD (Lienemann & Reid, 2008; Reid & Lienemann, 2006) and behaviour disorders (Adkins & Gavins, 2012; Lane et al., 2008; Mason & Shriner, 2008). It is hypothesized that a SRSD writing intervention will be successful at improving the paragraph writing skills of a sample of students with epilepsy as well.

Low self-efficacy beliefs for academics have been shown to have a negative impact on adolescents' school success (Bandura, 1986). SRSD writing interventions have been shown to improve individuals' attitudes towards writing and their beliefs of

themselves as writers (Mason, Harris & Graham, 2002). Since self-efficacy beliefs are formed by mastery experience and observation of others, it is expected that a SRSD paragraph writing intervention will improve both the writing skills and perceived self-efficacy of participants.

Purpose of the Present Study

The purpose of this study is twofold. First, this research will examine the effectiveness of a writing intervention based on the self-regulated strategy development (SRSD) approach for improving the paragraph writing ability of students with epilepsy. Second, this research will examine the effect the SRSD writing intervention has on participants' self-efficacy beliefs towards writing.

Little research has examined paragraph writing in students with epilepsy despite research that shows these students struggle with many of the component processes involved in this task (Croona, Kihlgren, Lundberg, Eeg-Olofsson & Eeg-Olofsson, 1999; Northcott et al., 2005, 2006; Vanasse et al., 2003). As teachers may not be aware of the learning needs of this population, this research aims to provide valuable information about the usefulness of a SRSD writing intervention for students with epilepsy.

Methodology

This section describes the current study's methodology. Sampling procedures and the measures used are outlined in detail. Intervention procedures are then described and the chapter concludes with an overview of expected results.

Research Design

A multiple baseline design across individuals with multiple probes (Kazdin, 2011) was used to monitor the overall effectiveness of the SRSD intervention. The intervention design was modeled after Milford and Harrison's (2010) intervention with a grade six student. Participants received instruction in groups of two for 40 minutes, once a week during a scheduled tutoring session. The writing intervention lasted ten sessions for one group and nine sessions for the other due to the time frame of the tutoring sessions, with instruction times randomized so that the participants worked with the researcher at different points during the tutoring session. Experimental conditions included baseline, instructional, independent performance and maintenance phases. This design ensured that changes in performance were due to the treatment rather than extraneous events (Kazdin, 2010). The data was then visually inspected to examine differences between baseline and independent phases. Percent non-overlapping data (PND, Scruggs & Mastropieri, 1998) was computed for number of words written, mechanics score, organization score, and total paragraph score. PND scores are strongly associated with treatment effectiveness, with higher ratings representing more effective treatment (Jacobson & Reid, 2012).

Participant Recruitment

Participants included two students in grade three and two students in grade five who were taking part in the "Tools for Success" tutoring program run jointly through the Victoria Epilepsy and Parkinson's Center and the University of Victoria's Centre for Outreach Education (CORE). As part of the tutoring program, all students were administered a Kaufman Test of Educational Achievement, Second Edition (KTEA-II-Kaufman & Kaufman, 2004) at the beginning of the program to assess areas needing intervention. Criteria for being included in the study included: (a) a diagnosis of epilepsy, and (b) a score on the writing portion of the KTEA-II of less than or equal to two-thirds of one standard deviation below the normative mean, equivalent to a standard score of or below 90, consistent with previous research that has used a similar cut-off on standardized measures to screen for writing difficulties (Harris, Graham & Mason, 2006; Mason, Kubina & Taft, 2011; Lienemann & Reid, 2006, 2008). As epilepsy is not a specific disorder, but a group of neurologically similar disorders, there is no single pattern of neuropsychological impairment in childhood epilepsy (Williams et al., 1998). Participants with all types of epilepsy were recruited and the type of epilepsy and seizure medication, if applicable, was recorded. The study was introduced to prospective parents during a parent night in the tutoring program, and interested parents contacted the researcher. Out of six possible participants, four expressed interest. Written consent was received from parents and participants prior to beginning the intervention (See Appendix A). A total of four students, two in grade three (one girl and one boy) and two in grade six (one girl and one boy) met the criteria for inclusion in this study. All four students began the study; however, one grade three boy struggled to produce any written

responses during the intervention. He exhibited substantial fine-motor difficulties and disclosed to the researcher that he used a computer for writing assignments at school. This participant stopped coming to the tutoring program after six intervention sessions and as such his scores have been excluded from this report.

Pre-intervention Assessment Measures

Cognitive measures.

Naming speed. The *RAN/RAS: Rapid Automatized Naming and Rapid Alternating Stimulus Tests* (Wolfe & Denckla, 2005) assess a child's ability to see a visual symbol, such as a letter, and to name it accurately and rapidly. The RAN/RAS tests were administered to assess children's fluency in accessing letter and digit codes in memory and in aspects of executive control for inhibitory control and cognitive set shifting. On all tests, the child was asked to name each stimulus item as quickly as possible without making any mistakes. The RAN letters subtest consists of five high-frequency lowercase letters (a, d, o, p, s). Stimulus items appear twice per row with no obvious repetitions per line (e.g., aa, dd). The selection of letters is based on Denckla and Rudel's (1974) principals. The RAN letters subtest has a test-retest reliability of .90.

Naming speed for shifting set. The *RAS* subtest consists of a sequence of letters, numbers, and colours that follow an ABCABCABC pattern. Like the RAN subtest, the child is asked to name each stimulus item as quickly as possible without making any mistakes. A child's score is based on the amount of time required to name all of the stimulus items. Test-retest reliability of this subtest is .91. Participants' results on both the RAN and RAS tasks are displayed in standard scores based on the test norms.

Orthographic processing. The *orthographic coding* measure was designed by Olson et al. (1989). The child is required to select the real word in a real word/non-word pair (e.g., rane/rain). Both stimuli are phonologically identical so the participant must use the orthographic representation of the word they have in memory. This type of task has been used in many studies to assess orthographic processing, the ability to form, store, and access orthographic representations (Sloboda, 1980; Stanovich & West, 1989; Barker, Torgesen & Wagner, 1992). Results are displayed as percentage of questions correct for this task.

Verbal span and verbal working memory. The *Wechsler Intelligence Scale for Children- Fourth Edition (WISC-IV;* Wechsler, 2003) *Digit Span* subtest is a core working memory subtest composed of two parts: Digit Span forward and Digit Span backward. Digit span forward requires the child to repeat increasingly longer number sequences in the same order as read by the examiner and is a measure of verbal short term memory. In the digit span backward subtest, the child is asked to repeat increasingly longer number sequences in reverse order. This is designed as a measure of auditory working memory for digits, sequencing skills, attention, and concentration (Groth-Marnat, 1997). The digit span subtest has a reliability coefficient range of .86 to .89 for nine to twelve year olds and results are displayed as scaled scores based on the WISC-IV normative sample.

Linguistic measures.

Phonological processing. The *Comprehensive Test of Phonological Processing (CTOPP;* Rashotte, Torgesen, & Wagner, 1999) *Elision* subtest is a 20-item test that measures syllable (beginning items) and phoneme deletion or the extent to which the

child can say a word, then say what is left after dropping out designated syllables or sounds. For example, at the phoneme level, the examinee is instructed, "Say *bold."* After repeating "bold," the examinee is told, "Now say *bold* without saying /b/." The correct response is "old." Standard scores are listed for participants based on the test's normative sample. Internal consistency reliability as measured by Cronbach's coefficient alpha ranges from .86-.90 for nine to twelve year olds.

Expressive vocabulary. The *WISC-IV* (Wechsler, 2003) *Vocabulary* subtest assesses the child's word knowledge and verbal concept formation. It also measures a child's fund of knowledge, learning ability, long-term memory, and degree of language development (Bannatyne, 1974). Children are asked to give definitions for words that are shown which the examiner reads out loud. Reliability coefficients for nine to twelve year olds for this subtest range from .87 to .91. Participants' results are listed as scaled scores.

Literacy measures.

Decoding. The *Wechsler Independent Achievement Test, Second Edition (WIAT-II;* Wechsler, 2001) *Pseudoword Decoding* subtest is used to measure an individual's ability to use letter-sound correspondence knowledge to decode nonsense words. For nine to twelve year olds the reliability coefficient for the pseudoword substest ranges from .97 to .98.

Spelling. The *WIAT-II* (Wechsler, 2001) *Spelling* subtest is used to measure an individual's ability to spell increasingly more difficult words. Reliability coefficients for this test range from .92 to .93 for nine to twelve year olds (split-half correlations corrected by the Spearman-Brown formula). Results for both the WIAT-II Pseudoword

Decoding and Spelling subtests are listed as standard scores based on this test's normative sample.

Handwriting fluency. Handwriting fluency was assessed by the task created by Berninger, Mizokawa and Bragg (1991). Participants were asked to write out the letters of the alphabet in order in lower-case letters as quickly as they could for one minute. Letters are counted towards a total letter count if they are in order and legible. This task has been shown to have an inter-rater reliability of .97 (Berninger et al., 1998) and has been used in several large-scale handwriting studies (Berninger, 1999). Grade based results were calculated using the *Process Assessment of the Learner - Second Edition: Diagnostics for Reading and Writing* handwriting task norms and are listed as scaled scores (Berninger, 2007).

Writing self-efficacy. Writing self-efficacy will be assessed using the *Writing Skills Self-Efficacy Scale* (Pajares & Valiante, 1997). This measure asks participants to make judgments about how sure they are that they can perform specific writing tasks on a scale from 0 (no chance) to 100 (completely certain). Seven questions were asked regarding participants' judgements about writing paragraphs and included such questions as: "How sure are you that you can: write details in your paragraph? give examples to support your ideas? write a good paragraph?" (See Appendix B). These questions were directly related to the writing task they were then asked to do, which was to write a paragraph in response to a written prompt. Pajares and Valiante (1997) reported coefficient alpha reliability of .88 and Pajares, Miller and Johnson (1999) obtained a Cronbach's alpha coefficient of .85 with a sample of 363 students in grades three to five.

Writing sample. Each child had ten minutes to write a paragraph based on a written prompt with no help from the researcher. Three samples of participants' data were collected to establish a stable baseline for paragraph writing ability (Kazdin, 2010).

Paragraph scoring. Paragraphs were scored based on the scoring criteria as described in the WIAT-II test manual. Scores were assessed across three domains: mechanics, organization, and vocabulary. For example, the mechanics (max. 9), scores were based on the number of spelling and punctuation errors in the paragraph. These errors were then converted to quartile scores, based on the WIAT-II standardization sample. The organization scores (max. 10) were based on sentence structure, linking expressions, examples, and order of ideas. The vocabulary scores (max. 5) gave a measure of lexical diversity. Each paragraph was also assessed for word count, number of details included, and the presence of a topic and concluding sentence.

Participants

Megan.

Megan[1] was eight years, nine months at the time of the intervention, and was diagnosed with benign rolandic temporal lobe epilepsy at the age of two. While previously on Tegretol, she had not been on any medication for over a year before the study took place. Megan had been coming to the Tools for Success tutoring program at the University of Victoria for three years at the time of the intervention, with most instruction during these sessions focused on the areas of reading and writing. She was not receiving any learning assistance during school. Megan obtained a standard score of 90 on the written portion of the KTEA-II prior to the intervention and was therefore included in the study.

[1] Pseudonym used

Megan's scores on the pre-intervention measures are found in Table 1. Megan scored slightly below average for her age on the task assessing verbal short-term memory (WISC-IV Digit Span Forward) and in the average range on the task assessing verbal working memory (WISC-IV Digit Span Backward). Megan was able to correctly distinguish between real word and non-word pairs that sounded alike, demonstrating good orthographic processing skills.

Megan scored in the average range for her age on the CTOPP Elision. She performed more poorly on measures of decoding (WIAT-II Pseudoword Decoding) and spelling (WRAT-3 Spelling), although she still performed in the average range for her age. On the measure of handwriting fluency, Megan was able to write 70 letters in one minute, which places her slightly below average based on her grade. On the writing self-efficacy questionnaire, Megan responded that she was "pretty sure" that she could write a paragraph including all the important parts, "real sure" that she could write a good paragraph, but not sure that she could write a good conclusion to her paragraph.

Laura.

Laura[2] was eleven years, three months at the time of the intervention and was diagnosed with tonic clonic seizures at the age of four. During the intervention, Laura was taking 250mg of Kappra twice a day to control seizures, but had been seizure free for two years. Laura had been attending the Tools for Success tutoring program for three years at the time the intervention took place. Laura was not receiving any learning assistance at school, although her mother reported that she struggled with math.

[2] Pseudonym used

Laura was included in this study because she obtained a standard score of 71 on the written expression portion of the KTEA-II. Laura's performance on the pre-intervention measures are shown in Table 1. Laura's performance on the measure of verbal short-term memory (WISC-IV Digit Span Forward) was slightly below average for her age whereas her performance on the verbal working memory task (WISC-IV Digit Span Backward) was in the average range. Laura performed similarly on measures of phonological processing (CTOPP Elision) and decoding (WIAT-II Pseudoword decoding), both in the average range for her age. Laura also performed in the average range on a measure of spelling in isolation (WRAT-3 Spelling). On the measure of handwriting fluency, Laura was able to write 58 letters in one minute, putting her slightly above average for her grade. With regards to her writing self-efficacy questionnaire, Laura responded that she was "somewhat sure" that she could write a good paragraph. She was least sure that she could write details, give examples to support her idea, and write a good conclusion to her paragraph.

James.

James[3] was eleven years, six months at the time of the intervention and was diagnosed with absence seizures at the age of seven. James was also diagnosed with a mild intellectual disability and Tourette's disorder. He was not on any medication for his epilepsy at the time of the study, but took Clonidine daily to manage the symptoms of Tourette's. James had been participating in the Tools for Success tutoring program for three years at the time of the intervention, with the majority of the sessions focused primarily on math. In school, James received Learning Assistance and at the time of the

[3]Pseudonym used

intervention was receiving remedial instruction in math and reading. James struggled with attention and required an aid at school to keep him on task and ensure he understood directions.

James achieved a standard score of 76 on the written expression subtest of the KTEA-II and was therefore included in this study. Spelling is a relative area of strength for James: he obtained a score in the low average range on a measure of word spelling in isolation (WRAT-3). James performed more poorly on measure of decoding (WIAT-II Pseudoword decoding) and phonological processing (CTOPP Elision), obtaining scores in the below average range expected for his age (See Table 1). James scored in the below average range on the measure of verbal short-term memory and in the average range on the measure of verbal working memory. His handwriting fluency was also assessed in the average range expected for his grade. James was also given a questionnaire examining his self-efficacy for writing. James was "somewhat sure" that he could write a good paragraph. He was also "somewhat sure" that he could write a paragraph including all the important parts, include a topic sentence in his paragraph, and write a good conclusion.

Table 1. Participant pre-intervention scores

	Student		
	Megan	Laura	James
Cognitive measures			
RAN Numbers	112	119	112
RAN Letters	119	102	116
Orthographic coding	100	100	89
WISC-IV Digit Span forward[a]	7	5	7
WISC-IV Digit Span backward	9	8	8
Linguistic measures			
CTOPP Elision	110	105	76
WISC-IV Vocabulary	8	6	6
Literacy measures			
WIAT-II Pseudoword decoding	93	97	84
WIAT-II Spelling	103	92	89
Handwriting Fluency	7	13	9

Notes: RAN = Rapid Automatized Naming; WISC-IV = Wechsler Intelligence Scale for Children 4th Edition; CTOPP = Comprehensive Test of Phonological Processing; WIAT-II = Wechsler Individual Achievement Test 2nd Edition.

[a] WISC-IV subtests have a scaled score mean of 10, standard deviation of 3. All other measures with the exception of Handwriting Fluency have a standard score mean of 100, standard deviation of 15.

Procedures

For an overview of the intervention procedures, see Figure 1.

Baseline phase procedures.

During the baseline phase the researcher met with each participant individually. Participants were administered cognitive measures assessing verbal short-term and working memory (WISC-IV digit span forward and backward) and rapid letter naming and switching (RAN/RAS). Linguistic measures were administered to examine phonological processing (CTOPP Elision), orthographic processing, and expressive vocabulary (WISC-IV Vocabulary). Finally, participants completed literacy tasks which included decoding (WIAT-II Pseudoword Decoding), spelling (WIAT-IIS), handwriting fluency, and paragraph writing tasks. Participants completed the writing self-efficacy questionnaire and were then asked to write a paragraph in response to a written prompt (See Appendix C for a full list of paragraph prompts). Participants were placed into groups of two based on age. The first group was comprised of Megan and Greg, and the second group was made up of Laura and James. SRSD instruction began for the first group of participants while the second group continued to respond to baseline paragraph prompts. The second group started the SRSD intervention one week after the first, in keeping with the research design.

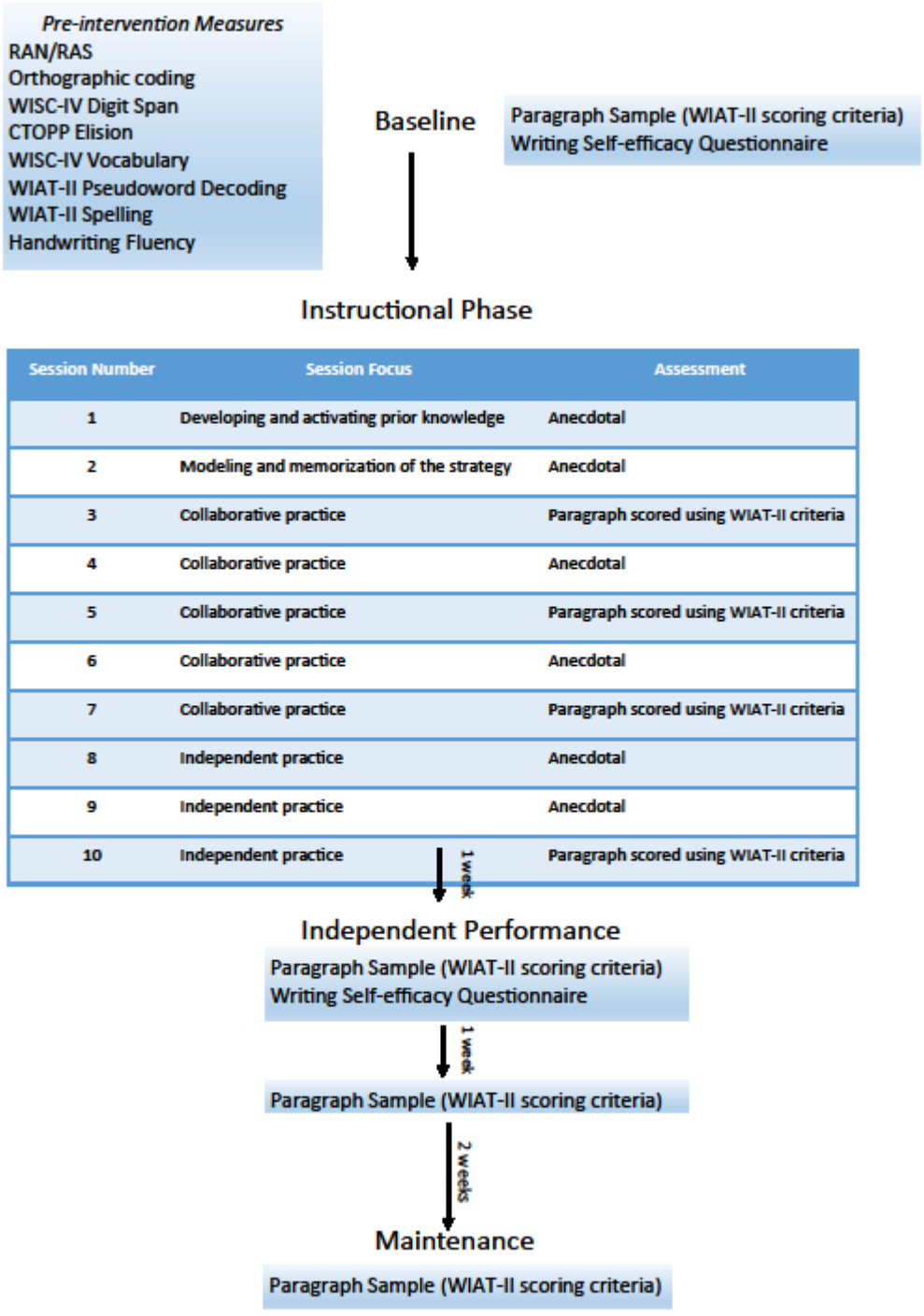


Figure 1. Intervention flowchart

Instructional phase procedures.

The SRSD intervention is based on Welch's (1992) SRSD intervention program to teach expository paragraph writing. Writing becomes especially important as students progress through school since they are required to write for a variety of purposes (BC Ministry of Education, 2010). This model uses the acronym PLEASE as described in chapter 2, which stands for: **P**ick a topic, **L**ist your ideas about the topic, **E**valuate your list, **A**ctivate the paragraph with a topic sentence, **S**upply supporting sentences, and **E**nd with a concluding sentence.

Participants learned to plan and organize their paragraphs, ensuring their paragraphs contained a topic sentence, ideas and supporting details, and a concluding statement. Difficulty with the mechanics of writing has been shown to impact written expression, so spelling instruction was embedded within the intervention (Treiman, 1998). Throughout the intervention, the conscious and deliberate use of meta-cognitive strategies was encouraged. These meta-cognitive strategies encouraged the participants to focus their attention on aspects of the writing process, including task analysis, goal setting, and self-monitoring. A checklist for each lesson was completed in order to ensure treatment fidelity (See Appendix D).

The six stages of SRSD are: (1) Developing and activating prior knowledge, (2) Discussion of the strategy, (3) Modeling of the strategy, (4) Mastery/memorization of the strategy, (5) Collaborative practice, and (6) Independent practice (Graham & Harris, 1994).

The weekly writing sessions incorporated these six stages and were as follows:

(1) Developing and activating prior knowledge and discussion of the strategy (Lesson 1)

During this stage the researcher discussed with participants what they knew about paragraphs and the reasons one might have for writing one. Participants read several examples of well-written and poorly written paragraphs, and the researcher lead a discussion on how they differ. Emphasis was placed on the parts of a well-written paragraph (topic sentence, supporting details, and concluding sentence); how the information fits together or is about one thing; and how correct spelling and punctuation contribute to the quality of the paragraph.

The PLEASE strategy was introduced to participants as a strategy for writing good paragraphs (Figure 1). Participants again read through the paragraph examples and identified the topic sentence, details, and concluding sentence in each one.

(2) Modeling and memorization of the strategy (Lesson 2)

The researcher began this session with a verbal review of the PLEASE acronym and the importance of the strategy for writing paragraphs. Participants had another opportunity to find the components of a paragraph (topic sentence, supporting details, and concluding sentence) within a well-written paragraph and discussed what makes the paragraph well-written. The researcher then modeled how to use the PLEASE strategy to write a paragraph. The researcher and participants collaboratively wrote a paragraph

using a graphic organizer (planning) and checked over the paragraph to see if all the components were there (revision).

The researcher modeled meta-cognitive strategies such as task analysis, goal setting, and self-monitoring. Self-statements are what a writer says to themselves before, during and after the writing process, and the researcher modeled how to come up with these statements during the writing process. This modeling as divided into three parts (Figure 2): "what do I say to myself: (1) to think of good ideas, (2) while I work, and (3) to check my work"? Self-statements help writers focus their attention during the writing process and also help with goal setting and progress tracking.

(3) Collaborative practice (Lessons 3-7)

This stage began with the third session and extended over five sessions. During this stage the researcher provided appropriate scaffolding to help the children write good paragraphs. Goal setting was introduced in relation to the presence of a topic and concluding sentence, number of details, and total words written. The Rocket Essay Graphing Sheet (Figure 3) was a visual way for participants to keep track of elements present. Participants were shown how to graph their own progress as they participated in the intervention.

Word choice was discussed with participants. "Million dollar words" are exciting words that are not used regularly; these were discussed and participants had opportunities to find million dollar words in paragraphs and to come up with their own. Participants were encouraged to find a place for at least one million dollar word when editing their paragraphs.

PLEASE

Pick your topic:

_____

List your ideas:

-
-
-
-
-

Evaluate your list

Activate with a topic sentence:

_____

Supply supporting details:

1.
2.
3.

End with a concluding sentence:

_____

Figure 2. Please Chart

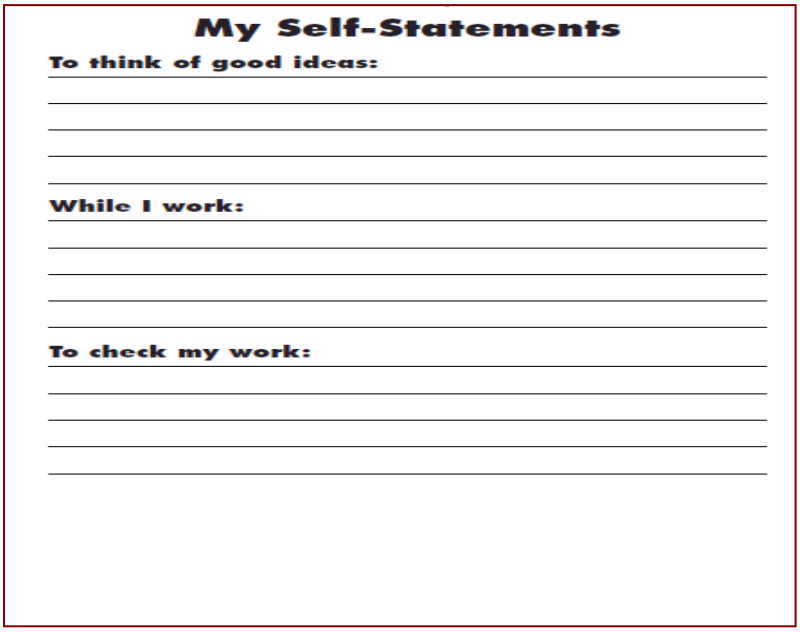


Figure 3. Self-statements chart

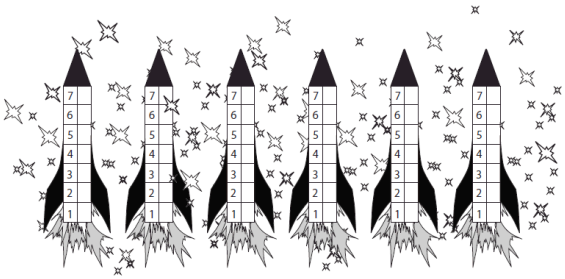


Figure 4. Rockets Graph

The researcher helped participants set goals regarding how many details and million dollar words they wanted to include. The researcher allowed the participants to take the lead in the paragraph-writing task and provided help and guidance as needed. After writing a paragraph, the participants reviewed it and graphed the results on their Rockets chart. The researcher and participants discussed their goal setting and strategy use.

Throughout this stage use of graphic organizers was slowly phased out and participants were guided in creating their own graphic organizers on blank paper.

Throughout the instructional phase anecdotal notes were made regarding participants' motivation and behavior as the intervention progresses. Multiple probes assessing participants' writing abilities as measured by the WIAT-II scoring criteria, word count, the presence of a topic and concluding sentence, and the number of details included were recorded as the intervention progressed. A description of these probes will be presented subsequently.

Independent performance procedures.

Independent performance procedures were identical to those in the baseline phase. The researcher worked individually with all participants. The researcher did not discuss with participants anything taught during the instructional phase. Participants were administered the writing self-efficacy questionnaire and then asked to write a paragraph in response to a written prompt.

Maintenance performance procedures.

The researcher met individually with participants two weeks after the final independent performance probe. The researcher did not review any of the information discussed in the intervention and participants were asked to write a paragraph in response to a written prompt.

Outcome measures

Assessment probes

Throughout the instructional phase, assessment probes were given during weeks 3, 5, 7, and 9 to examine the children's progress through the intervention. At the beginning of the session, the children were given a topic to write about and then allowed ten minutes to complete their paragraph. No review of the strategy took place before children wrote their paragraphs, but once they were finished the researcher led a discussion about the PLEASE strategy and how the children could use it in their writing. These four assessment probes were then scored using the WIAT-II paragraph scoring criteria evaluating mechanics (spelling and punctuation errors), organization (sentence structure, linking expressions, number of examples, and order of ideas), vocabulary, and word count.

During the independent performance and maintenance phases, assessment probes were given in the same manner as described above, but once the children finished writing their paragraphs the session ended with no discussion of the strategy.

Experimental design and statistical analysis

A multiple baseline-across participants design with multiple probes was used to examine intervention outcomes (Kazdin, 2010). Data was analyzed using traditional single case design procedures that included visual inspection to examine stability, level, and trend (Johnston & Pennypacker, 1993). Mean changes by phase and the percentage of nonoverlapping data points (PND) were used to examine intervention outcomes.

Results

The self-regulated strategy development writing intervention was taught to three elementary students with epilepsy. The results are presented in a way that corresponds to the research questions. The current study investigated (1) whether the SRSD intervention would improve the paragraph writing of participants from pre-test to post-test, and (2) whether participants' self-efficacy towards writing would improve following the intervention. Paragraphs written during baseline, independent performance, and maintenance are discussed with respect to words written, mechanics, organization, and total paragraph score based on the WIAT-II scoring criteria. Data was analyzed using traditional single case design procedures that included visual inspection to examine stability, level, and trend (Johnston & Pennypacker, 1993). Mean changes by phase and the percentage of nonoverlapping data points (PND) were used to examine intervention outcomes and are found in tables 2,4, and 6 for Megan, Laura, and James, respectively. Results of participants' self-efficacy beliefs are presented next. This section concludes with an overview of results across participants.

Megan

Baseline.

During baseline, Megan's paragraphs were short and poorly organized. In response to the first prompt, "My favourite game is...", Megan responded with phrases like, "Well I don't really know what my favourite game is" and "But lets not get sidetract on animals. Lets focus on that game. I still don't know what my favourit game is well eny way Ill have fun". Megan listed several games she liked to do and added details that

were not relevant to the topic. Megan did not show evidence of pre-planning any of her baseline paragraphs, but began to write as soon as she was allowed to.

Megan's mechanics scores on her baseline paragraphs were low due to punctuation and spelling errors. Paragraph organization was also low due to poor sentence structure, lack of linking expressions, and including irrelevant ideas (See Table 2). Megan used simplistic vocabulary with very few adjectives in her writing.

Instructional phase.

Megan responded favourably to the SRSD intervention. She quickly understood the PLEASE strategy and was able to recite it independently. Three weeks into the intervention, her mother told the researcher that Megan taught her the PLEASE strategy the night before. Megan began writing paragraphs that were longer and she enjoyed using the rockets graph to set goals for herself regarding the length of her paragraphs. During all of the instructional phase probes, Megan wrote paragraphs that were longer than her baseline paragraphs (See Figure 4).

As shown in Figure 6, the area where Megan showed the most improvement was in the organization of her paragraphs. By using the PLEASE chart, Megan was able to focus her attention on coming up with ideas that were related to her topic and evaluating these ideas to determine the ones she liked the best. The chart ensured that Megan listed only relevant information and the details she added enriched her paragraph rather than detracted from it. After instruction, Megan also began independently using the words first, next, and lastly to cue the reader to when she moved on to another idea, further improving her paragraph organization.

Paragraph mechanics remained variable throughout the intervention (See Figure 5). Due to the time constraints on the intervention, the researcher focused on sentence structure and punctuation errors and less on spelling. Megan did, however, begin independently examining her sentences and changing run-on sentences when reviewing her work.

Megan enjoyed coming up with "million dollar words", and when reviewing her paragraph she frequently looked for places to insert these words. Examples of the words Megan included are: humungous, gigantic, and incredible. Megan also began using more adjectives in her writing to describe her ideas, which made her writing more vivid.

Megan had some difficulty coming up with her self-statements (Figure 9), particularly with what she says to herself while she works. During the third lesson, while she filled out this self-statement, Megan wrote, "I get mad", in very small writing. When asked why she felt mad while writing, Megan replied that "it's not good". The researcher used this to start a discussion about how difficult writing can be and what good writers say to themselves in order to accomplish the task. When asked what she could say to herself when she gets mad, Megan responded with, "I'm a good writer" and "Remember my goal". By saying these things to herself Megan was able to remain motivated in the task at hand and change her negative response to the writing process into a positive one.

Megan also enjoyed using the rockets graph to set goals regarding how many ideas and details she wanted to use in her paragraph. By using the rockets graph, Megan was also able to ensure that she included both a topic and a concluding sentence in her paragraphs, both which were missing in her baseline paragraphs.

Independent performance.

During the two independent performance probes Megan spontaneously created her own PLEASE chart on scrap paper with no prompting from the researcher. She did not use the chart to the same extent as during the instructional phase, as she listed her ideas but no details, but she did organize her paragraph around this pre-planning tool.

In her first independent paragraph, Megan included both a topic and a concluding sentence and used guiding words like "the first thing" and "the next thing". She included many relevant ideas and adjectives to describe them. In her second independent paragraph, Megan also included a topic and concluding sentence. She listed fewer ideas in this paragraph, but provided more vivid details and descriptions of those ideas: "Then I tell my mom to give me my rain gatek (jacket) with pink harts on it. I run and jump in wet blue puttles." During the independent performance phase, Megan continued to write more words than she had during the baseline phase (See Figure 2).

Maintenance.

The maintenance probe was administered two weeks following the last independent performance probe, and four weeks after the last instructional session. During this session Megan immediately wrote the PLEASE mnemonic and used it to plan her paragraph. As she wrote she periodically returned to this chart and checked off information as she used it. Megan continued to use sequencing words, such as next and also, to organize her paragraph and included many adjectives. The word count of her paragraph remained above both baseline and instructional levels (See Figure 2). Megan's vocabulary was overall fairly simplistic, but she used some interesting phrases: "that would be delish and yummy", and "I would also want to have my face paited and dresst

up like reponzle (Rapunzle) with long long super long blond hair." Once she was finished, Megan re-read her paragraph and made corrections, focusing on punctuation errors and word choice.

Overall, at maintenance Megan wrote a paragraph that was longer, more complete, and which contained only relevant information compared with her baseline attempt (See Table 2). There was no evidence that Megan reviewed her paragraph once she was finished, but simply gave it to the researcher.

Table 2. Megan's paragraph scores based on WIAT-II scoring criteria

	Words written		Mechanics		Organization		Total paragraph	
	M	SD	M	SD	M	SD	M	SD
Megan								
Baseline (3)	74	45.8	3.6	1.5	4	1	8	1
Instructional (4)	146.5	5.2	2.8	0.5	7.8	.96	12.3	.96
Independent (2)	164	48.0	2.5	0.7	8.5	.71	12.5	2.1
Maintenance (1)	183	n/a	1	n/a	8	n/a	10	n/a
PND	100		0		100		100	

Note: Mechanics: /9; Organization: /10; Total paragraph: /24

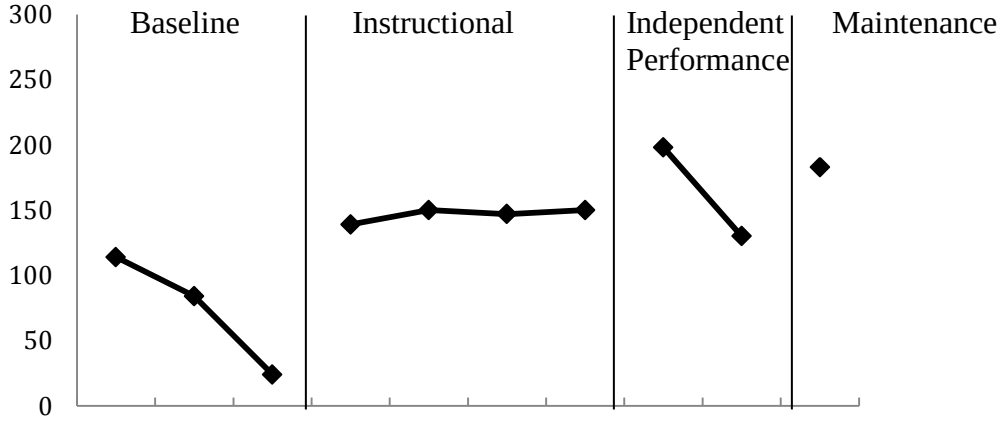


Figure 5. Effects of SRSD instruction on words written for Megan

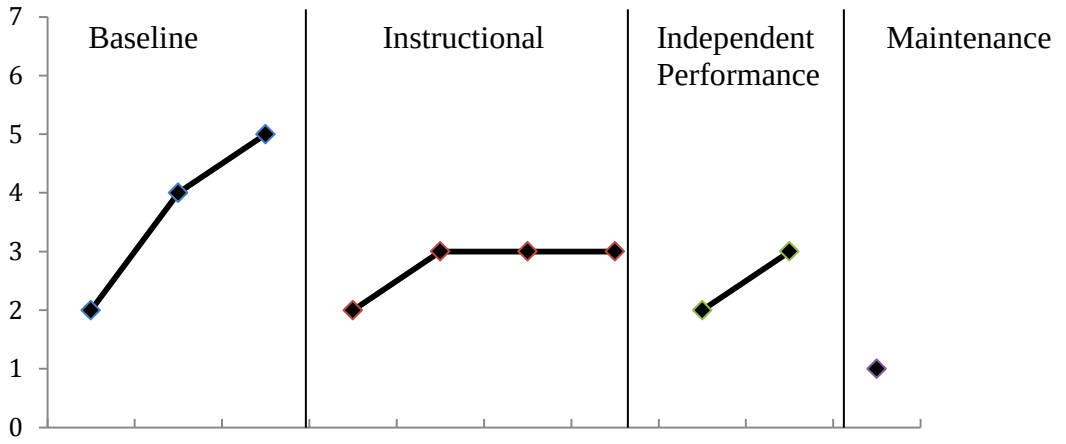


Figure 6. Effects of SRSD instruction on mechanics score for Megan

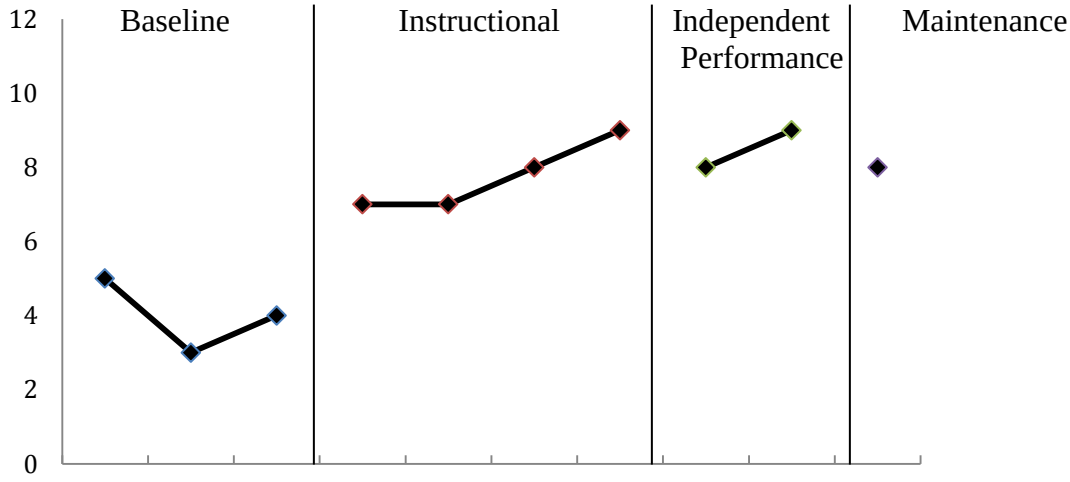


Figure 7. Effects of SRSD instruction on paragraph organization score for Megan

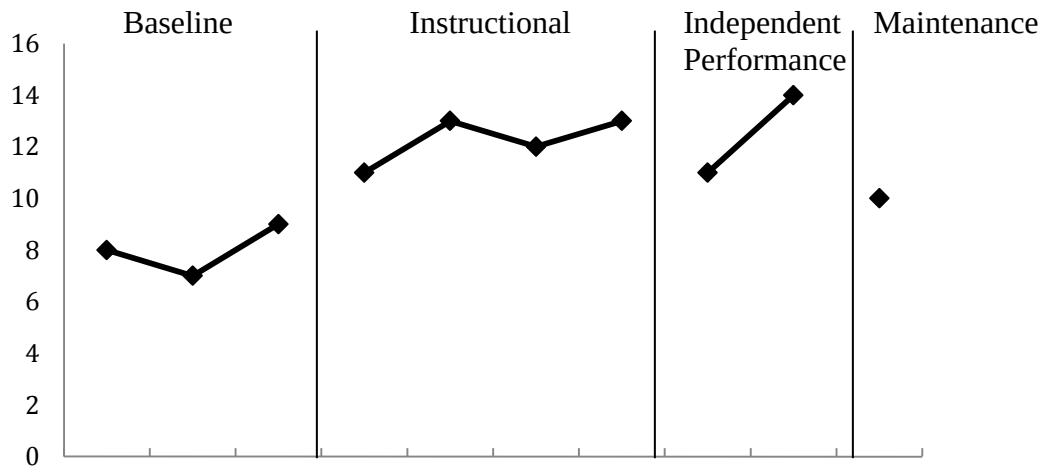


Figure 8. Effects of SRSD instruction on total paragraph score for Megan

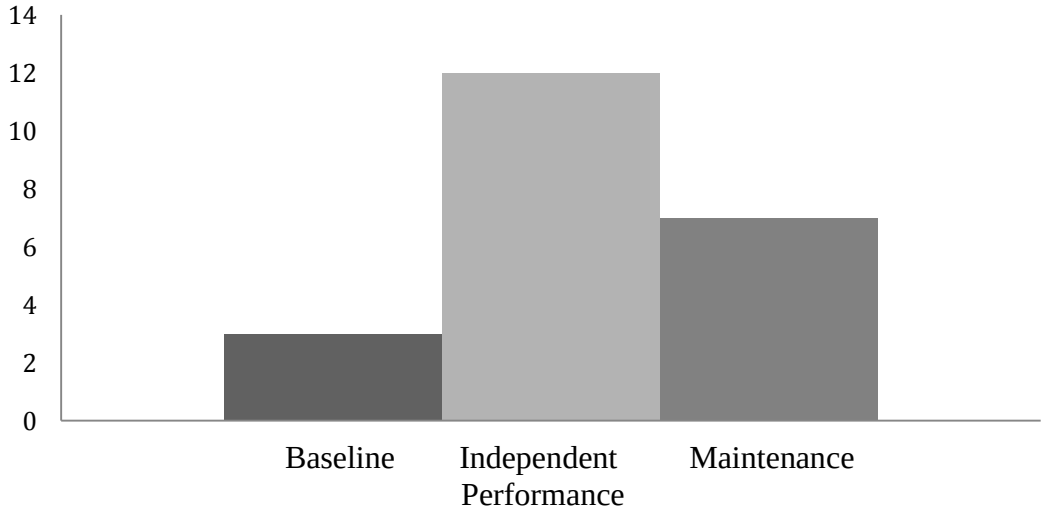


Figure 9. Number of ideas included in Megan's paragraphs

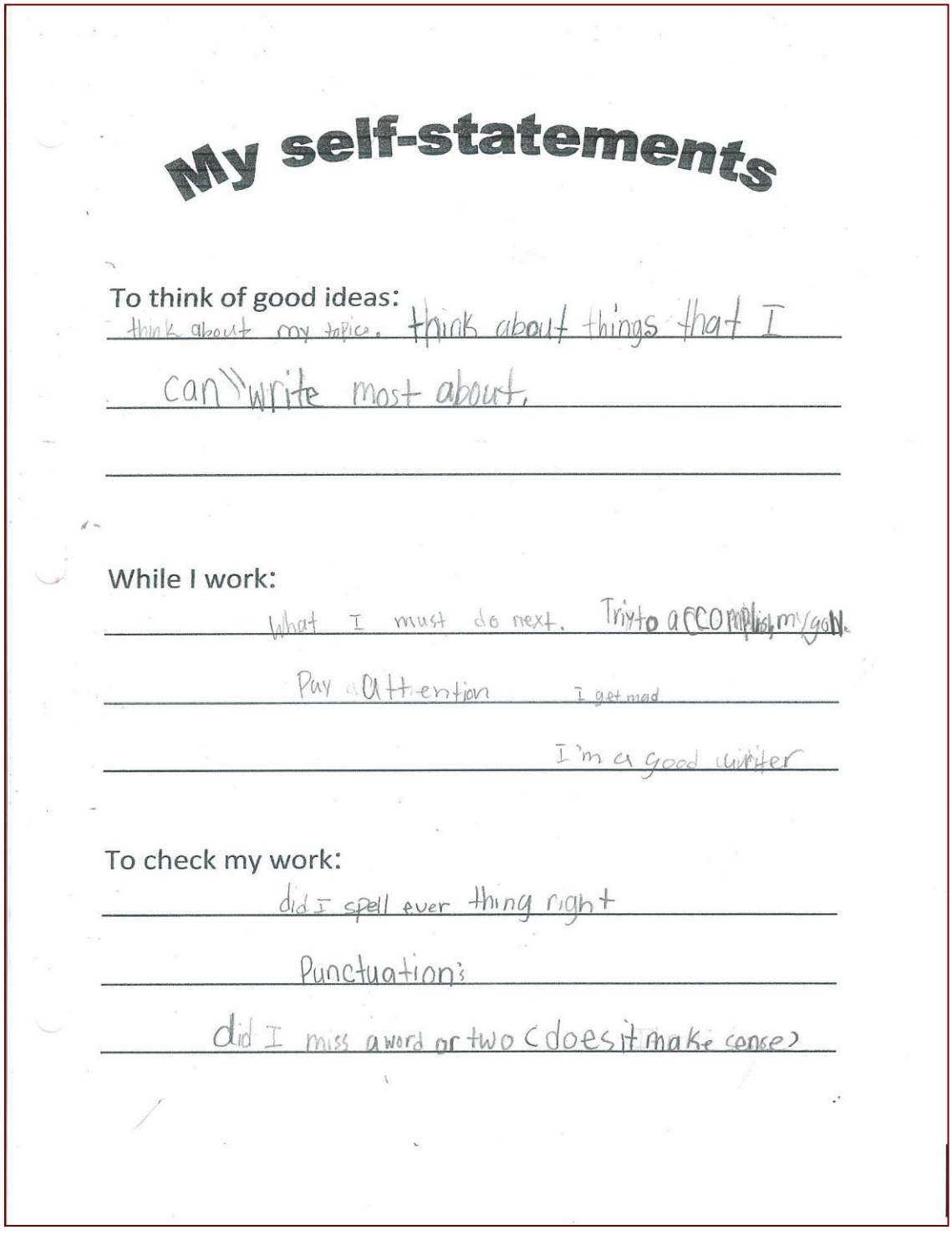


Figure 10. Megan's self-statements

Self-efficacy.

Megan was given a questionnaire examining her self-efficacy beliefs towards writing a paragraph before and after the intervention, and her scores are shown in Table 3. Megan was asked to determine how sure she was that she could perform specific writing tasks, on a scale from 0 to 100 (10: not sure; 40: somewhat sure; 70: pretty sure; 100: real sure). Overall, Megan's self-efficacy score increased from baseline to independent performance by 24.8%. When considering specific questions, Megan showed the largest increase when asked how sure she was that she could write a conclusion to her paragraph. At post-test, Megan's responses indicated that she was "real sure" she could perform each of the writing tasks inquired about, while at baseline her responses ranged from "not sure" to "real sure".

Table 3. Self-efficacy scores for Megan

Item	***Pre-test***	***Post-test***
Write a paragraph including all the important parts?	70	91
Include a topic sentence in your paragraph?	90	99
Write details in your paragraph?	100	100
Give examples to support your idea?	80	98
Write a good conclusion to your paragraph?	10	100
Write a paragraph that convinces a reader of your point of view?	100	100
Write a good paragraph?	100	99
Overall Self Efficacy Score (/100)	**78.6**	**98.1**

Note: 10= Not Sure; 40=Maybe; 70=Pretty Sure; 100=Real Sure

Summary of Megan's Response to the Intervention

Megan responded favourably to the SRSD writing intervention. She consistently wrote longer, better organized paragraphs throughout the instructional period, and these gains were maintained during the independent performance and maintenance phases (See Table 2). Megan appeared to enjoy reciting the PLEASE strategy at the beginning of each

instructional session and was proud that she was able to remember it. Although she originally had difficulty coming up with her self-statements, as the intervention progressed she seemed to understand the purpose of them as she often read over them as she planned her paragraph. Megan spontaneously created a PLEASE chart to plan her paragraphs in both the independent and maintenance phases, demonstrating that she understood the benefit of using it. Overall, Megan's paragraphs were longer, contained more ideas and relevant details, and better organized following the SRSD intervention.

Laura

Baseline.

Laura's baseline paragraphs were short and poorly organized. The majority of her sentences were run-on and she had many spelling and punctuation errors (See Table 4). In particular, she frequently forgot to start the beginning of a sentence with a capital letter. Laura's paragraphs were rambling and it was difficult for the reader to follow her train of thought: “if u had it u would think it would be fun to play with Because u know all that stuff shouting u parents and stuff the bullets also stick to u its pretty funney to.” There was no evidence of pre-planning and Laura started writing her paragraph as soon as she was allowed to.

Instructional phase.

Laura responded well to the PLEASE intervention. Although she was hesitant to work at first, she quickly learned the PLEASE strategy and could name each step by the third instructional session. Laura was in a group with James, and competition between the two of them was a motivating factor. Maintaining her focus during intervention sessions

was difficult for Laura and the researcher had to frequently redirect her to the task at hand.

Laura responded particularly well to the goal setting aspect of the intervention. She set reasonable goals for herself regarding how many words and ideas she wanted to include in her paragraph and was very motivated to achieve these goals. The number of words she wrote in the instructional phase increased each time and remained well above baseline levels (See Figure 10). Graphing her results worked well for her as she responded well to the visual reinforcement. She was noticeably excited to see her progress as the intervention progressed and frequently showed her graph to her parents after the intervention session ended.

Laura's mechanics scores remained variable throughout the instructional phase (See Figure 11). Spelling and punctuation remained an area of difficulty for Laura, but due to the time constraints of the intervention, instruction was limited to punctuation errors at the start and end of sentences.

As shown in Figure 12, Laura's paragraph organization improved greatly throughout the instructional phase. By using the PLEASE chart, Laura was able to organize her ideas into a more coherent form and use her goals to review and plan her paragraph effectively. One area in particular where Laura improved was in the use of linking expressions to organize her work. She used phrases such as, "another reason", "next", and "finally" to help organize her ideas. Laura also demonstrated improvements in her sentence structure and less of her sentences were run-on.

Laura's vocabulary remained simplistic throughout the intervention although she attempted to include some "million dollar words", such as humongous. Partly due to her

goals regarding the number of words she could write, Laura began including more adjectives towards the end of the intervention which made her paragraphs more detailed and colourful.

By the end of the instructional phase Laura was proficient at using the PLEASE strategy and was able to create her own PLEASE chart when instructed to. She seemed to enjoy writing about most topics and was able to articulate how she used the strategy and other places she might use it.

Laura had difficulty coming up with her self-statements, particularly with what she could say to herself while she worked (See Figure 15). Her responses to this statement included: "What I write next", "Use PLEASE", and "Make good paragraph". One of Laura's responses to "Check my work" was "Reread my sentence, think of words". Laura was good at remembering to look over her paragraph once she was done, checking for punctuation errors and places where she could insert "million dollar words". This in turn helped to increase her paragraph organization score.

Independent performance.

During the independent performance sessions Laura's paragraphs were longer and more detailed than the ones she wrote during the baseline phase (See Table 4). Laura did not make any notes to help herself pre-plan her paragraphs but took a few minutes to think before she began to write. Laura continued to use linking expressions such as "Another thing", "The next reason", and "The last reason" to help her reader follow her train of thought. Laura's ideas flowed logically from one to the next and she included many details in her paragraph: “One reason I like Christmas is Santa giving present’s. Why I like that is because the presents are stuff I wished for and he gives me everything I

wanted.” Her vocabulary continued to be simplistic and there was no evidence of any "million dollar words".

Maintenance.

Two weeks following the last independent performance session Laura wrote a final paragraph for her maintenance probe. Laura's paragraph was longer than those she wrote either during the baseline or independent performance phase (See Figure 10). While she did not use any written notes to pre-plan her paragraph, her paragraph contained only on-topic information and one idea flowed to the next. She continued to use linking expressions such as "Another thing" to guide her reader. Laura's vocabulary remained simplistic and she did not go back over and edit her paragraph once she was finished. Overall, Laura's maintenance paragraph was longer and more detailed than her baseline paragraphs.

Table 4. Laura's paragraph scoress based on WIAT-II scoring criteria

	Words written		Mechanics		Organization		Total paragraph	
	M	SD	M	SD	M	SD	M	SD
Laura								
Baseline (3)	72.3	65.0	2.7	3.1	1.7	1.2	4.7	2.1
Instructional (4)	199.2	36.3	1.0	1.3	8.5	.55	10.8	1.5
Independent (2)	132.5	10.6	3.0	1.4	9.5	.71	13.5	2.1
Maintenance (1)	234	n/a	2	n/a	9	n/a	12	n/a
PND	58		0		100		100	

Mechanics: /9; Organization: /10; Total paragraph: /24

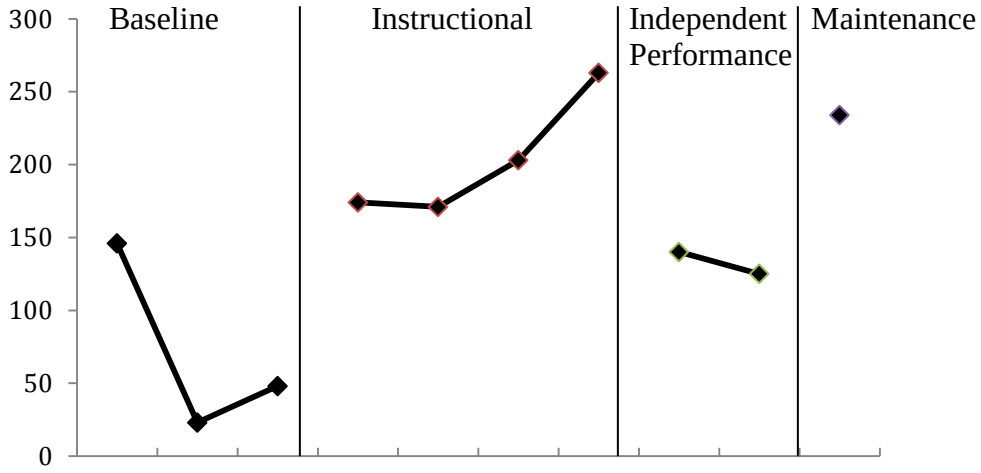


Figure 11. Effects of SRSD instruction on number of words written for Laura

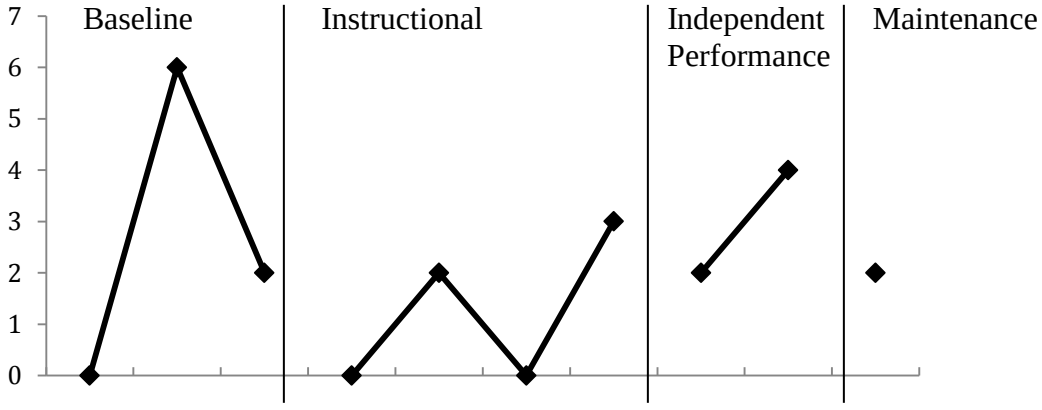


Figure 12. Effects of SRSD instruction on WIAT-II mechanics score for Laura

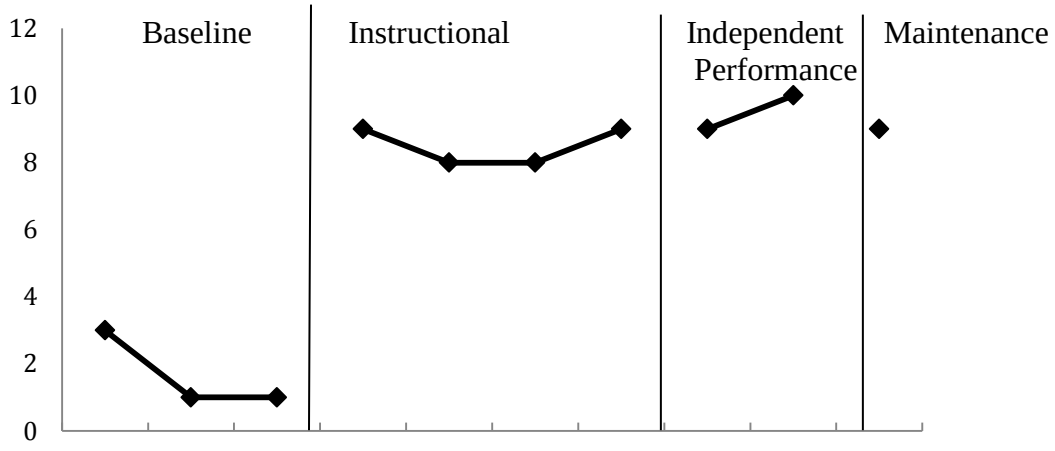


Figure 13. Effects of SRSD instruction on WIAT-II organization score for Laura

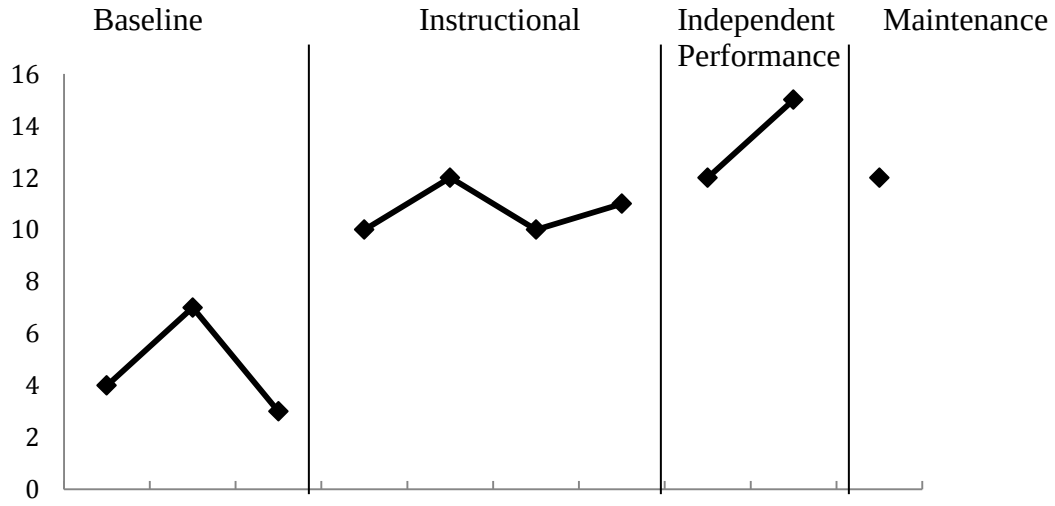


Figure 14. Effects of SRSD instruction on WIAT-II total paragraph score for Laura

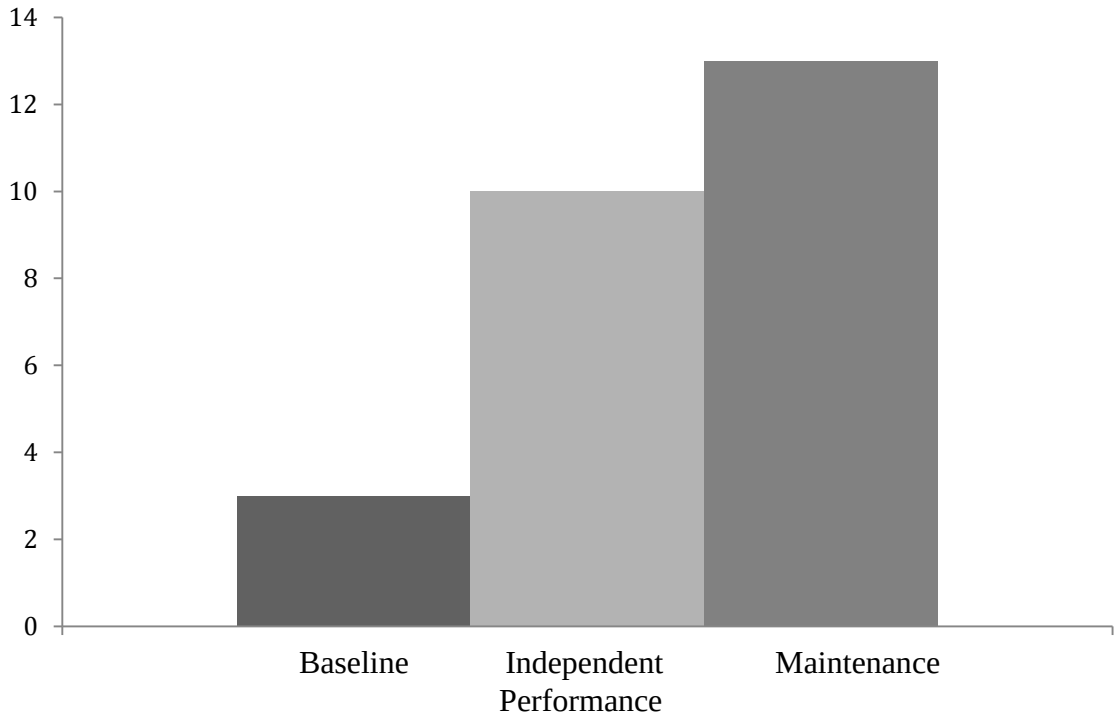


Figure 15. Number of examples included in Laura's paragraphs

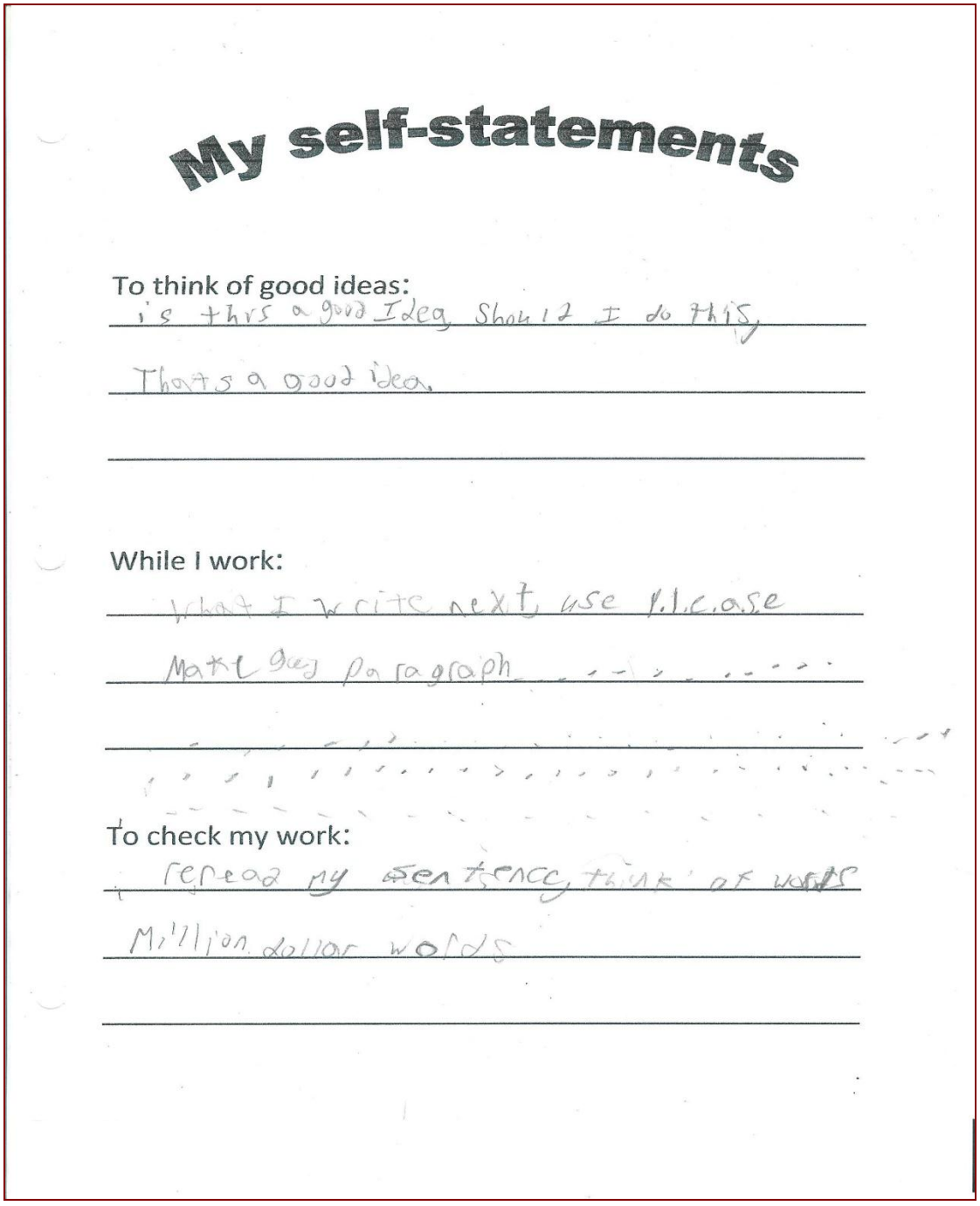


Figure 16. Laura's self-statements

Self-efficacy.

Laura was given a questionnaire examining her self-efficacy beliefs towards writing a paragraph before and after the intervention and her scores are shown in Table 5. Laura was asked to determine how sure she was that she could perform specific writing tasks, on a scale from 0 to 100 (10: not sure; 40: somewhat sure; 70: pretty sure; 100: real sure). Before the intervention, Laura was not sure that she could write details or give examples to support her ideas in her paragraph. She was somewhat sure that she could include all the important parts of a paragraph, write a good conclusion, and write a good paragraph. She was, however, real sure that she could write a paragraph that convinced a reader of her point of view. Following the intervention, Laura was real sure that she could include all the important parts, write details, and write a good paragraph, but interestingly, not sure that she could write a paragraph the convinced a reader of her point of view. Overall, Laura demonstrated an improvement in her self-efficacy beliefs about paragraph writing (Percentage increase: 46.9%)

Table 5. Self-efficacy scores for Laura

Item	***Pre-test***	***Post-test***
Write a paragraph including all the important parts?	40	100
Include a topic sentence in your paragraph?	90	100
Write details in your paragraph?	20	100
Give examples to support your idea?	20	50
Write a good conclusion to your paragraph?	30	40
Write a paragraph that convinces a reader of your point of view?	100	10
Write a good paragraph?	40	100
Overall Self Efficacy Score (/100)	**48.6**	**71.4**

Summary of Laura's Response to the Intervention

Laura responded favourably to the SRSD intervention. Her overall paragraph score showed consistent improvement throughout the instructional and independent

phases, and her maintenance paragraph remained above baseline levels (See Figure 13). Goal setting worked well for Laura, with respect to both total number of words and examples included in her paragraphs. Laura was proud of her work and made it a point to show her parents her progress as the intervention progressed. While she did not continue to use a PLEASE chart to plan her paragraphs during the independent and maintenance phases, Laura's paragraphs during these phases were still more organized than her baseline ones, suggesting that she was using some of the skills she learned during the intervention. Overall, Laura's paragraphs became longer, better organized, and more detailed throughout the intervention.

James

Baseline.

James did not obviously plan his baseline paragraphs but began writing as soon as he was allowed to. His first baseline paragraph was very short and simplistic. It contained only one complete sentence and multiple spelling and punctuation errors, contributing to a low mechanics and overall paragraph score (See Table 6). James' vocabulary at baseline was very simplistic. He included two ideas in his paragraph, but these were not expanded upon in detail which resulted in a very short paragraph:

> My favourite game is MW3, battlefield. because mw3 has a better map then mw2. battle field has a driffrent controle, pluse you get to Drive Helicupters, Jets, aa, tank, My favourit part about It Is that you can put mines Dow. (entire paragraph)

Instructional phase.

James was very hesitant at first to work on his writing and frequently engaged the researcher in conversation prior to instruction to delay the task. Once he began writing,

however, James became very focused and intent on his goals. James remembered the PLEASE acronym by the third lesson and was able to describe what each part stood for by the fifth lesson. James was in the same group as Laura, and as with her, competition between the two helped motivate them to remember the PLEASE acronym. During SRSD instruction all of James' paragraphs were longer than in the baseline phase (See Figure 16). James enjoyed using the words written graph to chart his progress and set goals for himself. Sometimes the goals he set were unrealistic, for example, wanting to write 250 words in his paragraph when previously he had written 127. The researcher guided James in coming up with a more realistic goal by reviewing what he had written before and emphasizing the importance of achievable goals.

Although James' mechanics scores throughout the instructional period show an upward trend, they remained below baseline levels (See Figure 17). As James' paragraphs became longer there were more spelling and punctuation errors present, which lowered his mechanics score. James also started using more sophisticated vocabulary, which resulted in more misspelled words.

James' organization score, though variable, showed some improvement compared to baseline levels (See Figure 18). James wrote paragraphs that contained more complete sentences with no off-topic information. Both the words written graph and the rockets graph motivated James to include more ideas and details in his paragraphs which therefore led to longer paragraphs. As shown in Figure 20, the mean number of examples James included increased from two to five from baseline to instructional phases. James also began organizing his paragraph by using words and phrases such as "also" and "the

next reason" to help guide the reader. More complete sentences, examples, and transition words helped increase James' organization scores above baseline levels.

James had some difficulty coming up with his self-statements (See Figure 21). In response to the prompt, "To think of good ideas", James was only able to come up with statements that related to the evaluation of his ideas, not the generation of them. When thinking about what to say to himself while he worked, James focused on the PLEASE strategy and his statements related to the organization of his paragraph and the procedural knowledge required to write. Although James wrote "Re Read my work" under the statement "To check my work", James rarely independently reviewed his work and required prompting to do so by the researcher. James was able to independently create and use his own PLEASE chart by the seventh instructional session.

Independent performance.

James was absent from the session one day and so only wrote one independent performance probe. James did not create a PLEASE chart to help organize his work, but instead took a minute to think before he began to write. Although he wrote fewer words in his paragraph than he did during the instructional phase, the number of words in his paragraph remained above baseline levels (See Figure 16) . James included five ideas in his paragraph and expanded on these ideas by including relevant details that made his paragraph more interesting. He used the linking expression "also" several times to connect ideas and his ideas flowed logically from one to another:

> My favourite holiday is december because when cristmas comes you ge presents and you can turn your t.v. into a fire place. Also we get a lot of stuff to eat for dinner like carates, ham, gravey, corn, peas, patio salad.

James' vocabulary remained fairly simplistic, but his use of details provided clarity in his writing.

Maintenance.

James wrote a final paragraph three weeks after his independent performance paragraph and four weeks following his last instructional session. James did not give any evidence of preplanning his paragraph but instead began writing as soon as he was allowed to. James' mechanics score was low due to a fair number of spelling and punctuation errors (See Table 6). His organization score also fell back to baseline levels, primarily due to poor sentence structure. His paragraph consisted of run-on sentences and he did not use any linking expressions. Although he included less ideas than he had during the independent performance phase, this number remained above baseline levels and James included several details to make his ideas more interesting (See Figure 20). His vocabulary remained fairly simplistic, but he included certain words that clarified his meaning and added interest, such as "snipping" (sniping), "automatic", and "defenders". Overall, James' maintenance paragraph was longer and more detailed than his baseline paragraph.

Table 6. James' paragraph scores based on the WIAT-II scoring criteria

	Words written		Mechanics		Organization		Total paragraph	
	M	SD	M	SD	M	SD	M	SD
James								
Baseline (3)	31	6.6	3.7	2.3	3	1	7	3
Instructional (4)	148.4	20.4	1.6	1.1	6.8	2.7	9.4	2.4
Independent (1)	89	n/a	2	n/a	8	n/a	11	n/a
Maintenance (1)	98	n/a	2	n/a	4	n/a	8	n/a
PND	100		0		90		30	

Mechanics: /9; Organization: /10; Total paragraph: /24

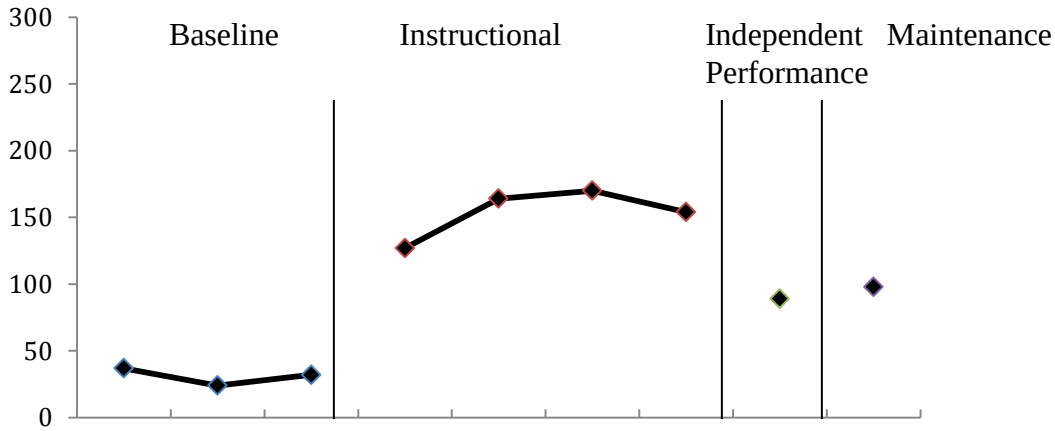


Figure 17. Effects of SRSD instruction on words written for James

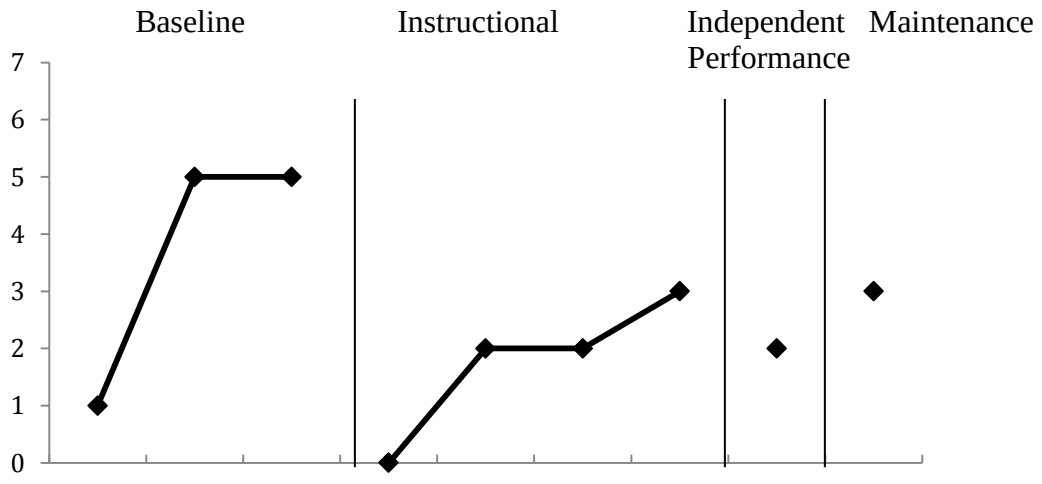


Figure 18. Effects of SRSD instruction on WIAT-II mechanics score for James

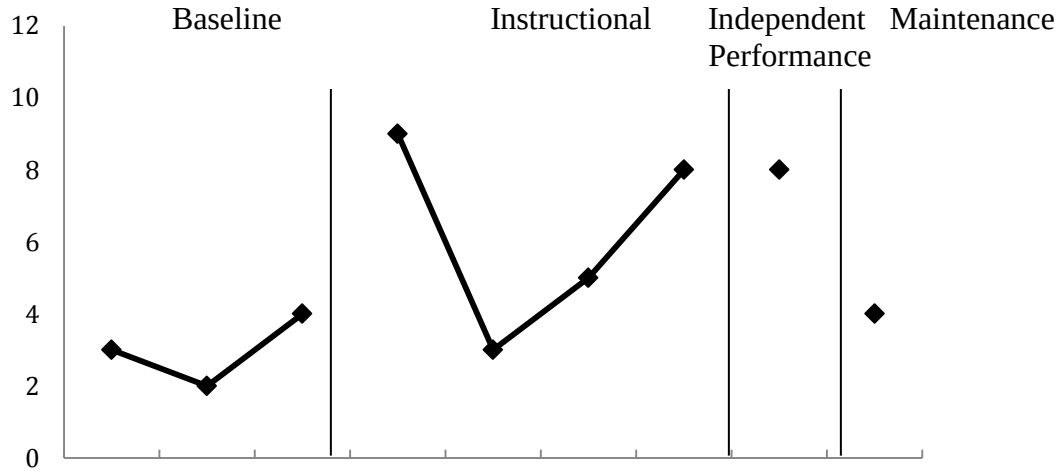


Figure 19. Effects of SRSD instruction on WIAT-II organization score for James

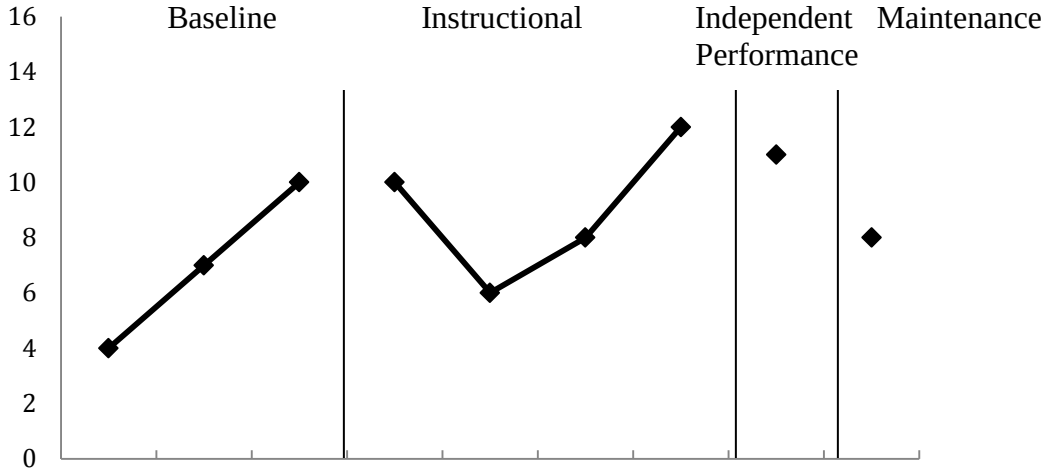


Figure 20. Effects of SRSD instruction on WIAT-II total paragraph score for James

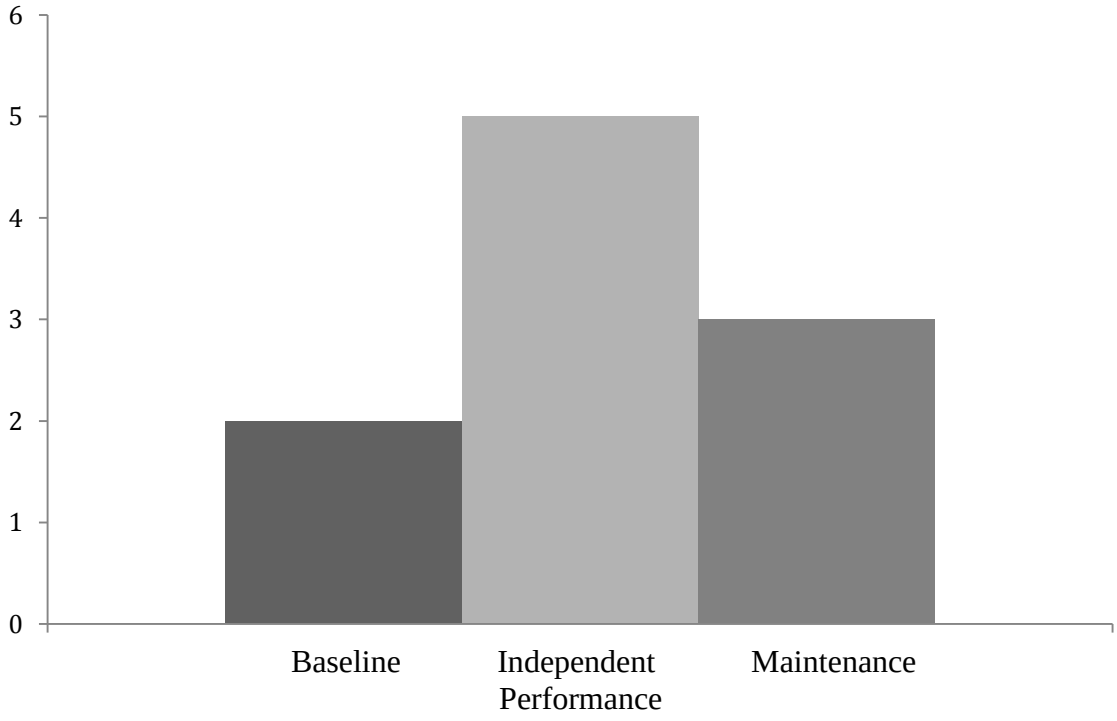
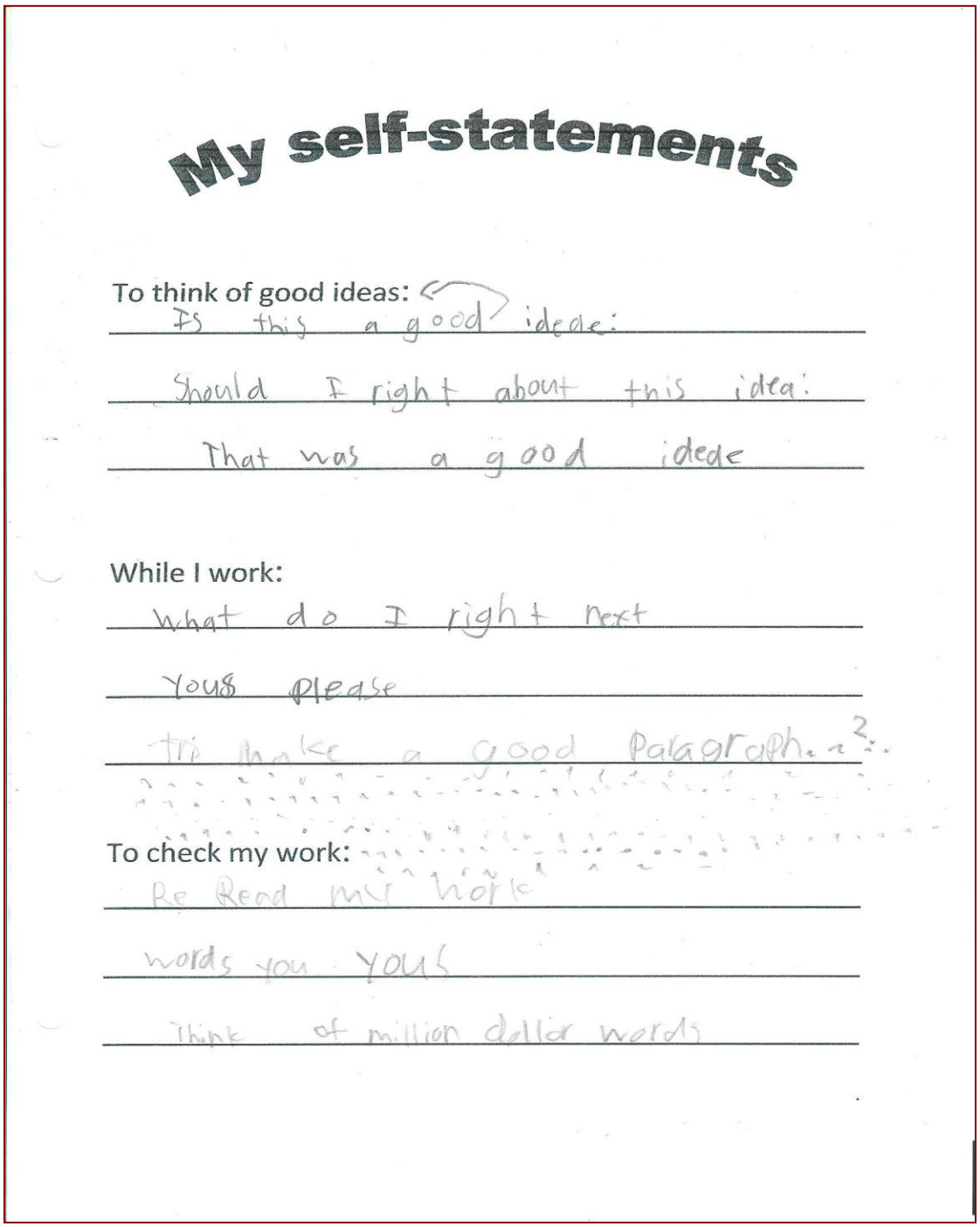


Figure 21. Number of examples included in James' paragraphs



My self-statements

To think of good ideas:

Is this a good idea:

Should I right about this idea:

That was a good idea

While I work:

what do I right next

Yous please

to make a good Paragraph.

To check my work:

Re Read my work

words you yous

Think of million dollar words

Figure 22. James' self-statements

Self-efficacy.

As shown in Table 7, James' self-efficacy for paragraph writing increased substantially from pre-test to post-test (Percentage increase: 124%). Before the SRSD intervention, James was only somewhat sure that he could write a paragraph including all the important parts, and include a topic sentence, details, examples, and a good conclusion in his paragraph. He was also only somewhat sure that he could write a good paragraph. Following the intervention, although he was still only somewhat sure he could write a paragraph including all the important parts, interestingly, he was "real sure" he could include a topic sentence, details, and examples in his paragraph. He was also real sure that he could write a good paragraph.

Table 7. Self-efficacy scores for James

Item	***Pre-test***	***Post-test***
Write a paragraph including all the important parts?	40	30
Include a topic sentence in your paragraph?	40	100
Write details in your paragraph?	50	100
Give examples to support your idea?	50	100
Write a good conclusion to your paragraph?	40	50
Write a paragraph that convinces a reader of your point of view?	40	80
Write a good paragraph?	40	100
Overall Self Efficacy Score (/100)	**42.9**	**80**

Note: 10= Not Sure; 40=Maybe; 70=Pretty Sure; 100=Real Sure

Summary of James' Response to the Intervention.

James displayed a variable response to the SRSD paragraph writing intervention. The intervention appeared to motivate James to take more of an interest in his writing and he wrote paragraphs that were longer and more complete during the instructional phase (See Table 6). James worked hard to include more descriptive words in his writing and his paragraphs became better organized. Not all of these gains were maintained once

instruction ceased, however, as James' organization score fell back to baseline levels. He did continue to include more details and ideas than he did prior to the intervention, but did not show any pre-planning of his paragraph.

Intervention summary

Overall, following the intervention, the students wrote paragraphs that were longer and more complete. During baseline, none of the participants demonstrated any preplanning of their paragraphs and organization scores were low. After SRSD instruction all participants consistently used the PLEASE planning strategy independently to organize their paragraphs and ensure they had included all of the essential paragraph parts. All students were able to independently create and use the PLEASE chart to guide their progress and Megan continued using this chart independently four weeks following the last SRSD lesson. The students responded favourably to the goal setting component of the intervention and enjoyed making goals for themselves regarding the number of words and ideas they wanted to include in their paragraphs then graphing this information themselves.

Students' overall paragraph scores, as assessed by the WIAT-II scoring criteria, improved following the intervention. This increase was mainly due to the improvement in paragraph organization, including the use of examples, linking expressions, and the logical flow of the paragraphs. In general, participants maintained their gains into the follow-up phase, which occurred four weeks following the last intervention session. Paragraphs continued to be longer and more complete than in the baseline phase. All participants demonstrated a substantial increase in the number of words written in their paragraphs compared to baseline levels. Participants continued to demonstrate increases

in paragraph organization and overall quality at maintenance. PND for paragraph organization score varied from 90 to 100 for all three participants, suggesting that this intervention was particularly effective at improving this area of participants' paragraphs. All participants showed an increase in self-efficacy for paragraph writing following the intervention. Participants were "real sure" they could write a good paragraph and include all the important parts of a paragraph. Collectively, these findings indicate strong improvements in the completeness, length, and organization of participants' writing following the intervention.

Discussion

The current study responded to the need for research examining the efficacy of a SRSD intervention for improving the paragraph writing skills of students with epilepsy. More specifically, the purpose of the current study was to determine whether the self-regulated strategy approach, shown to be effective for individuals with learning disabilities and ADHD (Rogers & Graham, 2008; Graham & Perin, 2007) would also be effective for individuals with epilepsy given the effects epilepsy has on cognitive functioning (Tromp, et al., 2003; Henkin et al., 2005; Northcott et al., 2005, 2007). A secondary aim of this study was to examine what effect the SRSD writing intervention would have on participants' self-efficacy beliefs towards writing. This section will examine the results of each student individually, then synthesize the results across the students. Finally, study limitations and implications for practice are discussed.

Megan

As determined by the pre-intervention measures, phonological processing was a relative strength for Megan and she achieved slightly lower scores on the measures of decoding and spelling. Spelling is an important component of the writing process, and previous research has indicated that when lower level skills such as spelling are not automated, cognitive resources that could otherwise be used in higher level skills such as organization are diverted to this task (Just & Carpenter, 1992). Indeed, spelling errors played a large role in Megan's baseline paragraph scores and resulted in low mechanics scores. Megan's performance in the lower level writing areas such as spelling and punctuation remained variable throughout the intervention, as no direct instruction in spelling was given due to the limited time frame of the intervention. Despite Megan's

poor mechanics scores, her overall paragraph scores showed improvement throughout the course of the SRSD intervention.

One area where Megan showed tremendous improvement throughout the intervention was in her paragraph organization. Megan quickly understood and used the PLEASE acronym to plan her paragraphs and was often observed reviewing her planning sheet throughout the writing process. Individuals are only able to consciously attend to a limited number of items at any one time as cognitive resources are limited (Sweller, 1988). When writing, individuals can manage this cognitive load by either automating the sub-components of the task or sequencing the activities so that attention may be focused on only one aspect at a time. By using the PLEASE strategy effectively, Megan was able to focus her attention on one aspect of the writing process at a time and this resulted in longer and more coherent paragraphs.

Megan became more self-directed with respect to her writing following the SRSD intervention. A large part of the intervention was aimed at improving Megan's self-regulation strategies through the discussion of self-statements and through goal setting. Under the heading "While I work", one of Megan's self-statements related to the procedural knowledge taught through the PLEASE strategy ("What I must do next"). By reviewing this self-statement, Megan was able to remind herself of the organization of her paragraph and work through her ideas sequentially. Megan's second self-statement in this category was "Try to accomplish my goal". As discussed previously, goal setting is an important component to self-regulated learning (Winne & Hadwin, 1998). As the intervention progressed, Megan became more adept at setting appropriate goals for herself regarding the length of her paragraph and the number of ideas she included. Self-

regulated learners are continually monitoring their progress and using meta-cognitive strategies to monitor behaviour in order to achieve their goals. Writing down her self-statements made these strategies explicit and Megan was able to consciously attend to each one. Indeed, Megan was frequently observed reviewing both her self-statements sheet and her PLEASE chart while she worked. The SRSD intervention was highly effective for Megan and she demonstrated substantial improvements in both the length and the quality of her paragraphs.

Megan's self-efficacy beliefs towards writing similarly improved following the SRSD intervention. According to Graham and Harris (1989), the effective use of a strategy increases the likelihood that the same strategy will be used in the future. As Megan experienced success in achieving her goals as the intervention progressed, she was more inclined to use the same strategies that led to her success in subsequent writing tasks. This in turn also increased her belief that she would be successful at the task. Self-efficacy beliefs are formed in large part through past experience (Bandura, 1986). The meta-cognitive strategies taught in this SRSD intervention helped Megan monitor her progress and achieve her goals, and as she experienced success her beliefs that she would be successful in future writing tasks improved.

Laura

Laura is a grade five student whose performance on the pre-intervention measures shows that she has well developed phonological processing and decoding skills. Similar to Megan's results, spelling and punctuation errors resulted in low mechanics scores for Laura's baseline paragraphs. Laura's mechanics scores continued to remain variable throughout the intervention as little instruction focused on these aspects specifically.

Similarly to Megan, the area where Laura showed the most improvement was in paragraph organization. Her organization scores based on the WIAT-II scoring criteria improved greatly from the baseline to independent performance phases, and these gains were maintained four weeks following the last instructional session. The goal setting aspect of the intervention was a strong motivating factor for Laura, and this led her to create longer and more complete paragraphs. Motivation has been shown to have a powerful positive effect on an individual's performance and experience in writing (Hidi, Renninger, & Krapp, 2004). Achievement motivation tends to decline in early adolescence (Eccles et al., 1984). According to Klassen (2002), this tends to be due to both individual factors (e.g., the increasing realism of self-reflections and perceptions of ability) and environmental factors (e.g., the school environment and classroom tasks). While children often begin school enjoying writing stories, this motivation frequently diminishes for students who struggle with writing. These students may experience academic failure, self-doubts, and unrealistic task expectations, which leads to poor motivation (Mason, Harris & Graham, 2002). The SRSD intervention helped Laura to improve her task understanding and create realistic goals for herself. As she found herself meeting and even exceeding these goals her motivation for writing improved, which in turn led to improved writing performance.

Closely tied to motivation is the construct of self-efficacy. Following the intervention, Laura's reported self-efficacy towards paragraph writing increased substantially. This finding is consistent with previous research that has found self-efficacy to increase following strategy based writing interventions. Specifically, Schunk and Swartz (1993) examined the relationship between 50 fifth grade students' writing

self-efficacy and their writing skills. The authors found that strategy use was positively correlated with self-efficacy, and that self-efficacy was highly predictive of both writing skill and strategy use in this population. One interesting finding in this study was that Laura's self-efficacy belief that she could write a paragraph that convinces a reader of her point of view dropped substantially following the intervention. Persuasive paragraphs were not discussed during the current writing intervention, and so this finding may be due to an unfamiliarity with this writing genre. Despite this, Laura demonstrated substantial improvements in her paragraph writing ability and created paragraphs that were longer and more complete following the current SRSD intervention.

James

James is a more complex case than the other two participants due to his co-morbid Tourette's disorder and Mild Intellectual Disorder. His case is not unique, however, as research has suggested that as many as one in four children with epilepsy also have a co-occurring intellectual disability (Ellenberg et al., 1984; Murphy et al., 1995; Camfield & Camfield, 2003). On the pre-intervention measures, spelling was an area of relative strength for James; however, he scored below average expected for his age on the measures of spelling, phonological processing, and decoding. Attention and focus are also areas of concern and at school James requires an educational assistant to ensure he does not miss instructions or become confused due to his attention difficulties.

James' intervention results are more variable than those of Megan or Laura. When examining his scores across the different areas, James performed most poorly on paragraph mechanics and this brought down his total paragraph score. This result is not surprising given James' difficulties with lower level writing processes and the fact that

this intervention did not specifically target these areas. Considering his difficulties with spelling and punctuation, previous research suggests that James may have benefited more from spelling instruction embedded within the SRSD intervention (Berninger et al., 2002), and this may be an avenue for further research.

James has more attentional and intellectual difficulties than the other two students and may have benefitted from a longer intervention. While he showed improvements during the instructional and independent performance phases, James' maintenance paragraph dropped back to baseline levels with respect to organization score. Individuals with intellectual disabilities have been shown to take more time to acquire new skills and have difficulty using strategies such as planning, organizing, and monitoring (Arabsolhar & Elkins, 2000; Banikowski & Mehrig, 1999). Although there are studies that examine the effectiveness of SRSD instruction for individuals with learning disabilities (Santangelo, Harris & Graham, 2008; Welch, 1982), there are few that examine it for individuals with intellectual disabilities. De La Paz and Graham (1997) investigated the effects of persuasive writing instruction for one student with a mild intellectual disability. Following the intervention, the number of essay parts included and words written increased; however, essay quality improved only slightly. Although his results were more variable than the other two participants, James' overall paragraph writing quality did improve following the intervention compared to his baseline levels.

James' self-efficacy towards writing showed the most increase of all participants. Following the intervention, James was confident that he could write a good paragraph. When asked specifically about the components of a good paragraph (i.e., topic sentence,

ideas, conclusion), James was "real sure" that he could include them, but when asked generally how sure he was that he could include all the "important parts of a paragraph", James was less sure. Although James was sure he could include these parts when they were explicitly stated, this finding suggests that he was still unsure of all the important parts of a paragraph following the intervention. James' experiences writing longer and more complete paragraphs throughout the intervention did improve his beliefs that he could write good paragraphs in the future.

Findings across participants

In response to the first question, this study found that the SRSD intervention did improve the overall paragraph writing skills of the participants. Prior to intervention, all participants' paragraphs were short and poorly organized. Following intervention, Megan and Laura wrote paragraphs that were longer and more complete, while James' performance was more variable. In particular, participants showed the most improvements in the organization of their paragraphs. These gains were maintained four weeks following the last intervention session, suggesting this SRSD intervention is an effective way to improve the writing skills of students with epilepsy.

The number of words written and the number of details included in their paragraphs increased for all participants throughout the course of the intervention. Participants seemed to enjoy graphing their results and making goals for themselves for their next paragraph. Laura in particular seemed to thrive on setting a goal for herself and seeing herself improve. One potential drawback to the words written graph was a brief trade-off of quality for quantity, as Laura and James were more interested in getting the most words down on a page as possible. As the intervention progressed, however, all

participants spent more time brainstorming ideas and adding relevant details in order to make their paragraphs longer. Participants used the rockets graph to ensure they had included all the important parts of a paragraph and to set goals regarding the number of ideas they included. Participants were able to use these charts to create and self-monitor their own goals, thereby making their paragraphs longer and more complete. This supports previous research which has shown that goal setting and self-monitoring can increase both the amount and quality of individuals' writing (Harris et al., 1994). A major part of the intervention was aimed at improving participants' ability to set appropriate goals for themselves based on their task understanding and prior experience. The effect of this goal setting is most easily seen by the increase in the number of words written in each paragraph as the intervention progressed. Students with learning disabilities often include less content in their written work and SRSD interventions have been shown to increase the quantity of their writing (Harris et al., 1994). Similarly, this study shows that using a SRSD intervention with students with epilepsy also has a positive impact on the number of words written and the amount of ideas included in their paragraphs, thus improving overall writing quality.

Paragraph mechanics scores did not improve for any participant throughout the intervention, with spelling errors contributing the most to poor scores. Research has shown that students with LD often stress form over content more often (Graham, Schwartz, & MacArthur, 1993). These difficulties in lower level text production skills often disrupt a student’s ability to engage in higher order composing behaviors like planning and revising (Graham, 1990). While embedding spelling instruction within writing instruction has been shown to be an effective way to improve performance

(Berninger et al., 2002), given the short time frame and the spelling difficulties exhibited by all participants on the WIAT-II pre-intervention assessment, the intervention focused more heavily on higher level writing skills like organization.

One of the most dramatic improvements for all participants was in the area of organization. According to Hayes and Flower (1986), strategic knowledge is important to the planning stage of the writing process. This intervention was effective because it provided participants with the strategic knowledge necessary to plan and write a complete paragraph and different strategies they could use to accomplish the task. Individuals are only able to consciously attend to a limited number of items at any one time as cognitive resources are limited (Sweller, 1988). When writing, individuals can manage this cognitive load by either automating the sub-components of the task or sequencing the activities so that attention may be focused on only one aspect at a time. The current SRSD intervention provided participants with an effective strategy for sequencing the components of the writing process. When considered within Winne and Hadwin's theory of SRL (1998), participants had practice understanding the purpose of the assignment and what was expected of them (task understanding). Participants became knowledgeable in the major components of a paragraph (i.e., topic sentence, supporting details, and concluding sentence), and as shown by the post-intervention self-efficacy report, became more confident that they could include all the major parts of a paragraph in their work. Participants also became more aware of self-regulatory strategies, as evidenced by their self-statements and strategies, which have been shown to be important in the writing process and included planning, monitoring their progress, and maintaining their motivation by remembering their goals (Graham & Harris, 1990).

Self-regulated learning occurs through the four recursive stages discussed previously: task understanding, goal setting and planning, task enactment, and small and large scale adaptations (Winne & Hadwin, 1998). Participants were required to reflect on several of these stages during the self-statements task that was discussed during each intervention session. The purpose of the self-statements task was to increase the participants' awareness of strategies such as goal setting, planning, progress monitoring, and behaviour adaptations. Of the three self-statement categories, participants had the most difficulty coming up with responses to "while I work". This self-statement was attempting to tap into what self-regulated learners do while writing: self-monitor progress, make self-evaluations based on their goals, and find ways to maintain cognitive and motivational engagement in the task. Modelling of these strategies throughout the writing process also gave participants practice using the strategies so that they would be more likely to use the strategies independently. The current SRSD intervention was an effective way for all participants to become aware of the meta-cognitive aspects involved in the writing process and to learn strategies to monitor their own progress through the writing stages.

Effects on Self-Efficacy

Self-efficacy beliefs are formed from prior experience and affect an individual's choice in activities, the effort they put forth in those activities, and their performance (Bandura, 1986; Schunk & Swartz, 1993). Participants reported higher self-efficacy beliefs towards paragraph writing following the intervention, with percentage increases of 24% to 124% on the self-efficacy questionnaire. The most powerful contributors to self-efficacy beliefs are one's own previous experiences (Bandura, 1986). SRSD

instruction is scaffold in such a way that individuals are able to achieve success. Through goal setting and progress monitoring, participants were able to see their improvements and achieve their goals. This outcome is consistent with previous research that found increases in self-efficacy following writing strategy interventions (Schunk & Swartz, 1993)

SRSD and Students with Epilepsy

An important aspect of the current study is that SRSD combines self-regulatory strategies, such as task analysis, goals setting, self-monitoring and self-reinforcement, with writing strategies. Individuals with epilepsy have been shown to be at a higher risk for having learning difficulties, particularly in the area of writing (Fastenau et al., 2008), which may in part be due to the self-regulatory difficulties often exhibited by these individuals (Tromp, et al., 2003; Henkin et al., 2005; Caplan et al., 2008). The SRSD intervention was particularly effective at improving participants' paragraph organization skills. One area individuals with epilepsy have been shown to have difficulty with is planning and problem solving (Croona, Kihlgren, Lundberg, Eeg-Olofsson & Eeg-Olofsson, 1999). SRSD is particularly effective for teaching writing skills to individuals with epilepsy because a major component of the SRSD model is systematic instruction in planning and self-regulatory techniques.

Limitations

There were several limitations of the current study. First, only three students were included. Due to time constraints and because participants were recruited from within an ongoing tutoring session, it was not possible to work with more than three students.

Future research should include a larger and more diverse population of students with epilepsy.

A second of the current study is the variation in type of epilepsy among participants. Due to the limited recruitment pool it was not possible recruit participants with a certain type of epilepsy. Previous research has suggested, however, that epilepsy has a more diffuse, generalized effect on cognitive functioning regardless of seizure type (Williams et al., 1998), thereby reducing the impact of this variation.

Third, regarding the intervention itself, very little time was devoted to lower level writing processes such as spelling and punctuation due to time constraints. Previous research has shown the effectiveness of embedding spelling instruction within a writing intervention (Berninger et al., 2002); therefore the current study could have been improved by including spelling instruction.

A fourth limitation was that the study did not examine if the effects of the SRSD intervention transferred to different genres of writing, such as story writing. Past research with students who were poor writers has shown that such instruction does have a positive impact on story writing and generalizes to untaught genres (Adkins & Gavins, 2012). It cannot be assumed, however, that such effects will be seen for students with epilepsy and writing difficulties and this should be examined in future research.

A final limitation is due to the research design itself. The current study took place within an ongoing tutoring session and this limited both the pool of potential participants and the time frame of the study. In a multiple baseline design, participants remain in the baseline phase until a stable baseline has been reached. Although due to the time constraints of this study participant only remained in the baseline phase for three

sessions, this has been shown to be an appropriate amount of time to observe a stable baseline (Kazdin, 1982). Additionally, while in the relatively short time frame of the intervention all three participants demonstrated improvements in their paragraph writing performance, a longer intervention may have helped improve participants' maintenance scores, particularly James'.

Conclusions and Implications for Practice

The current study adds to the body of research showing that SRSD interventions are effective for students with writing difficulties (Adkins & Gavin, 2012; Baker et al., 2009; Glaser & Brunstein, 2007; Graham & Harris, 2003). Individuals with epilepsy and co-occurring writing difficulties may benefit from the SRSD approach since this type of intervention gives students specific strategies to mitigate the cognitive difficulties associated with epilepsy. Some students with epilepsy may require a longer intervention and periodic discussion of self-regulatory techniques. It is important that teachers continually monitor their students' progress through various assessment measures and review SRSD instruction as needed. The systematic instruction in planning and self-regulatory techniques was particularly helpful for the participants.

Assessment is an essential component of instruction for students with learning difficulties. Instruction is more effective and efficient if it is also being evaluated and modified based on this evaluation (Vaughn & Bos, 2009). Having students self-monitor their own progress can increase their motivation in learning; a well-planned SRSD writing intervention will include the learner in setting goals and evaluating their progress.

Findings from this study support the feasibility of using SRSD to improve the length, organization, and quality of paragraphs written by students with epilepsy. The

intervention outlined in this study gives teachers a practical strategy for teaching students with epilepsy who struggle with writing. The PLEASE strategy was straightforward to put into practice and has the potential to be implemented in today's inclusive classrooms, as teachers can easily adjust the amount of scaffolding they give to students to differentiate the intervention for a variety of learners. The next steps should include investigating the effectiveness of SRSD instruction within a classroom setting, and the effectiveness when delivered by classroom teachers.

Bibliography

Aarnoutse, C., van Leeuwe, J., & Verhoeven, L. (2005). Early literacy from a longitudinal perspective. *Educational Research and Evaluation, 11*(3), 253-275.

Abbott, S. P., Reed, E., Abbott, R. D., & Berninger, V. W. (1997). Year-long balanced Reading/Writing tutorial: A design experiment used for dynamic assessment. *Learning Disability Quarterly, 20*(3), 249-63.

Adkins, M. H., & Gavins, M. V. (2012). Self-regulated strategy development and generalization instruction: Effects on story writing and personal narratives among students with severe emotional and behavioral disorders. *Exceptionality, 20*(4), 235-249.

Albuquerque, C. P. (2012). Rapid naming contributions to reading and writing acquisition of european portuguese. *Reading and Writing, 25*(4), 775-797. doi:10.1007/s11145-011-9299-6

Aldenkamp, A. P. (1994). Psychosocial adaptation after normalisation of physical symptomatology: Cognitive complaints of children and their parents after seizure remission: In search of the time-delay model. *International Journal of Adolescent Medicine and Health, 7*(4), 303-315. doi:10.1515/IJAMH.1994.7.4.303

Anderman, E. M., & Maehr, M. L. (1994). Motivation and schooling in the middle grades. *Review of Educational Research, 64*(2), 287-309. doi:10.2307/1170696

Annegers, J. F., Rocca, W. A., & Hauser, W. A. (1996). Causes of epilepsy: Contributions of the rochester epidemiology project. *Mayo Clinic Proceedings, 71*(6), 570-575.

Arabsolghar, F., & Elkins, J. (2000). Comparative expectations of teachers and parents with regard to memory skills in children with intellectual disabilities. *Journal of Intellectual and Developmental Disability, 25*(3), 169-179. doi:10.1080/13269780050144253

Arunkumar, G., Wyllie, E., Kotagal, P., Ong, H. T., & Gilliam, F. (2000). Parent- and patient-validated content for pediatric epilepsy quality-of-life assessment. *Epilepsia, 41*(11), 1474-1484.

Austin, J. K., Huberty, T. J., Huster, G. A., & Dunn, D. W. (1999). Does academic achievement in children with epilepsy change over time? *Developmental Medicine and Child Neurology, 41*(7), 473-479.

Bailet, L. L., & Turk, W. R. (2000). The impact of childhood epilepsy on neurocognitive and behavioral performance: A prospective longitudinal study. *Epilepsia, 41*(4), 426-431.

Baker, S. K., Chard, D. J., Ketterlin-Geller, L., Apichatabutra, C., & Doabler, C. (2009). Teaching writing to at-risk students: The quality of evidence for self-regulated strategy development. *Exceptional Children, 75*(3), 303-318.

Bandura, A. (1986). *Social foundations of thought and action : A social cognitive theory*. Englewood Cliffs, N.J: Prentice-Hall.

Bandura, A. (1997). *Self-efficacy : The exercise of control*. New York: W. H. Freeman.

Bandura, A., Barbaranelli, C., Caprara, G. V., & Pastorelli, C. (1996). Multifaceted impact of self-efficacy beliefs on academic functioning. *Child Development, 67*(3), 1206-1222. doi:10.2307/1131888

Banikowski, A. K., & Mehring, T. A. (1999). Strategies to enhance memory based on brain-research. *Focus on Exceptional Children, 32*(2), 1-16.

Bannatyne, A. (1974). *Programs, materials and techniques* Journal of Learning Disabilities.

Barker, T. A., Torgesen, J. K., & Wagner, R. K. (1992). The role of orthographic processing skills on five different reading tasks. *Reading Research Quarterly, 27*(4), 334-345. doi:10.2307/747673

Berninger, V. W. (1999). Coordinating transcription and text generation in working memory during composing: Automatic and constructive processes. *Learning Disability Quarterly, 22*(2), 99-112. doi:10.2307/1511269

Berninger, V. W. (2002). Best practices in reading, writing, and math assessment-intervention links: A systems approach for schools, classrooms, and individuals. In A. Thomas, & J. Grimes (Eds.), (pp. 851-865). Washington, DC US: National Association of School Psychologists.

Berninger, V. W. (2009). Highlights of programmatic, interdisciplinary research on writing. *Learning Disabilities Research & Practice, 24*(2), 69-80.

Berninger, V. W., Abbott, R. D., Jones, J., Wolf, B. J., Gould, L., Anderson-Youngstrom, M., Apel, K. (2006). Early development of language by hand: Composing, reading, listening, and speaking connections; three letter-writing modes; and fast mapping in spelling. *Developmental Neuropsychology, 29*(1), 61-92. doi:10.1207/s15326942dn2901_5

Berninger, V. W., & Fuller, F. (1996). A process model of writing development across life span. *Educational Psychology Review, 8*(3), 193.

Berninger, V. W., Mizokawa, D. T., & Bragg, R. (1991). Theory-based diagnosis and remediation of writing disabilities. *Journal of School Psychology, 29*(1), 57-79. doi:10.1016/0022-4405(91)90016-K

Berninger, V. W., & Vaughan, K. (1998). Early intervention for spelling problems: Teaching functional spelling units of varying size with.. *Journal of Educational Psychology, 90*(4), 587.

Berninger, V. W., Vaughan, K., Abbott, R. D., Begay, K., Coleman, K. B., Curtin, G., Graham, S. (2002). Teaching spelling and composition alone and together: Implications for the simple view of writing. *Journal of Educational Psychology, 94*(2), 291-304. doi:10.1037/0022-0663.94.2.291

Berninger, V. W., Yates, C., & Lester, K. (1991). Multiple orthographic codes in reading and writing acquisition. *Reading and Writing, 3*(2), 115-149. doi:10.1007/BF00420030

Berninger, V. W., & Richards, T. L. (2002). *Brain literacy for educators and psychologists*. Amsterdam ; Boston: Academic Press.

Berninger, V., Abbott, R., Rogan, L., Reed, E., Abbott, S., Brooks, A., Graham, S. (1998). Teaching spelling to children with specific learning disabilities: The mind's ear and eye beat the computer or pencil. *Learning Disability Quarterly, 21*(2), 106-122. doi:10.2307/1511340

Berninger, V., & Traweek, D. (1991). Effects of a two-phase reading intervention on three orthographic-phonological code connections. *Learning and Individual Differences, 3*(4), 323-338. doi:10.1016/1041-6080(91)90019-W

Borden, K. A., Burns, T. G., & O'Leary, S. D. (2006). A comparison of children with epilepsy to an age-and IQ-matched control group on the children's memory scale. *Child Neuropsychology, 12*(3), 165-172. doi:10.1080/09297040500276836

Butterbaugh, G., Olejniczak, P., Roques, B., Costa, R., Rose, M., Fisch, B., Skinner, J. (2004). Lateralization of temporal lobe epilepsy and learning disabilities, as defined by disability-related civil rights law. *Epilepsia, 45*(8), 963-970. doi:10.1111/j.0013-9580.2004.29803.x

Calkins, L. (1994). The art of teaching writing. Portsmouth, NH: Heinemann.

Heinemann.Camfield, C., Camfield, P., Smith, B., Gordon, K., & Dooley, J. (1993). Biologic factors as predictors of social outcome of epilepsy in intellectually normal children: A population-based study. *The Journal of Pediatrics, 122*(6), 869-873.

Caplan, R., Siddarth, P., Stahl, L., Lanphier, E., Vona, P., Gurbani, S., Shields, W. D. (2008). Childhood absence epilepsy: Behavioral, cognitive, and linguistic comorbidities. *Epilepsia, 49*(11), 1838-1846. doi:10.1111/j.1528-1167.2008.01680.x

Christensen, C. A. (2005). The role of orthographic-motor integration in the production of creative and well-structured written text for students in secondary school. *Educational Psychology, 25*(5), 441-453. doi:10.1080/01443410500042076

Croona, C., Kihlgren, M., Lundberg, S., Eeg-Olofsson, O., & Eeg-Olofsson, K. (1999). Neuropsychological findings in children with benign childhood epilepsy with centrotemporal spikes. *Developmental Medicine & Child Neurology, 41*(12), 813-818. doi:10.1017/S0012162299001620

Cunningham, A. E., & Stanovich, K. E. (1990). Assessing print exposure and orthographic processing skill in children: A quick measure of reading experience. *Journal of Educational Psychology, 82*(4), 733-740. doi:10.1037/0022-0663.82.4.733

Daigneault, S., Braün, C. M., & Whitaker, H. A. (1992). An empirical test of two opposing theoretical models of prefrontal function. *Brain and Cognition, 19*(1), 48-71. doi:10.1016/0278-2626(92)90037-M

De La Paz, & Graham, S. (1997). Effects of dictation and advanced planning instruction on the composing of students with writing and learning problems. *Journal of Educational Psychology, 89*(2), 203-22.

Denckla, M. B., & Rudel, R. (1974). Rapid 'automatized' naming of pictured objects, colors, letters and numbers by normal children. *Cortex: A Journal Devoted to the Study of the Nervous System and Behavior, 10*(2), 186-202.

Denckla, M. B. (1994). Measurement of executive function. In G. R. Lyon, & G. R. Lyon (Eds.), *Frames of reference for the assessment of learning disabilities: New views on measurement issues.* (pp. 117-142). Baltimore, MD US: Paul H Brookes Publishing.

Eccles, J. (1984). Sex differences in achievement patterns. *Nebraska Symposium on Motivation, 32,* 97-132.

Ehri, L. C., & Wilce, L. S. (1980). The influence of orthography on readers' conceptualization of the phonemic structure of words. *Applied Psycholinguistics, 1*(4), 371-385. doi:10.1017/S0142716400009802

Ellenberg, J. H., Hirtz, D. G., & Nelson, K. B. (1984). Age at onset of seizures in young children. *Annals of Neurology,* (15), 127-134.

Fastenau, P. S., Shen, J., Dunn, D. W., & Austin, J. K. (2008). Academic underachievement among children with epilepsy: Proportion exceeding

psychometric criteria for learning disability and associated risk factors. *Journal of Learning Disabilities, 41*(3), 195-207.

Fulk, B. M., & Stormont-Spurgin, M. (1995). Spelling interventions for students with disabilities: A review. *The Journal of Special Education, 28*(4), 488-513. doi:10.1177/002246699502800407

Glaser, C., & Brunstein, J. C. (2007). Improving fourth-grade students' composition skills: Effects of strategy instruction and self-regulation procedures. *Journal of Educational Psychology, 99*(2), 297-310. doi:10.1037/0022-0663.99.2.297

Graham, S. (1990). The role of production factors in learning disabled students' compositions. *Journal of Educational Psychology, 82*(4), 781.

Graham, S. (2006). Strategy instruction and the teaching of writing: A meta-analysis. In J. Fitzgerald (Ed.), *Handbook of writing research.* (pp. 187-207). New York, NY US: Guilford Press.

Graham, S., & Harris, K. R. (1989). Components analysis of cognitive strategy instruction: Effects on learning disabled students' compositions and self-efficacy. *Journal of Educational Psychology, 81*(3), 353-61.

Graham, S., & Harris, K. R. (1993). Self-regulated strategy development: Helping students with learning problems develop as writers. *The Elementary School Journal, 94*(2), 169-181. doi:10.1086/461758

Graham, S., & Harris, K. R. (2003). Students with learning disabilities and the process of writing: A meta-analysis of SRSD studies. In S. Graham (Ed.), *Handbook of learning disabilities.* (pp. 323-344). New York, NY US: Guilford Press.

Graham, S., Harris, K. R., & MacArthur, C. A. (1993). Improving the writing of students with learning problems: Self-regulated strategy development. *School Psychology Review, 22*(4), 656-670.

Graham, S., & MacArthur, C., and Schwartz, S.S. (1995). Effects of goal setting and procedural facilitation on the revising behavior and writing.. *Journal of Educational Psychology, 87*(2), 230.

Graham, S., & Perin, D. (2007). A meta-analysis of writing instruction for adolescent students. *Journal of Educational Psychology, 99*(3), 445-476. doi:10.1037/0022-0663.99.3.445

Graham, S., Schwartz, S. S., & MacArthur, C. A. (1993). Knowledge of writing and the composing process, attitude toward writing, and self-efficacy for students with and without learning disabilities. *Journal of Learning Disabilities, 26*(4), 237-249. doi:10.1177/002221949302600404

Graves, D. H. (1983). *Writing : Teachers and children at work*. Portsmouth, N.H: Heinemann Educational Books.

Gregg, N., Hoy, C., & Sabol, R. (1988). Spelling error patterns of normal, learning-disabled, and underprepared college writers. *Journal of Psychoeducational Assessment, 6*(1), 14-23. doi:10.1177/073428298800600102

Groth-Marnat, G. (1997). *Handbook of psychological assessment (3rd ed.)*. Oxford England: John Wiley & Sons.

Hacker, D. J., Plumb, C., Butterfield, E. C., Quathamer, D., & Heineken, E. (1994). Text revision: Detection and correction of errors. *Journal of Educational Psychology, 86*(1), 65-78. doi:10.1037/0022-0663.86.1.65

Harris, K. R., & Graham, S. (1992). Self-regulated strategy development: A part of the writing process. In J. T. Guthrie (Ed.), *Promoting academic competence and literacy in school.* (pp. 277-309). San Diego, CA: Academic Press.

Harris, K. R., Graham, S., Reid, R., & McElroy, K. (1994). Self-monitoring of attention versus self-monitoring of performance: Replication and cross-task comparison studies. *Learning Disability Quarterly, 17*(2), 121-139. doi:10.2307/1511182

Hayes, J. R., & Flower, L. S. (1980). Writing as problem solving. *Visible Language, 14*(4), 388-99.

Hayes, J. R., & Flower, L. S. (1986). Writing research and the writer. *American Psychologist, 41*(10), 1106-1113. doi:10.1037/0003-066X.41.10.1106

Henkin, Y., Sadeh, M., Kivity, S., Shabtai, E., Kishon-Rabin, L., & Gadoth, N. (2005). Cognitive function in idiopathic generalized epilepsy of childhood. *Developmental Medicine & Child Neurology, 47*(2), 126-132. doi:10.1017/S0012162205000228

Hermann, B., Jones, J., Sheth, R., Dow, C., Koehn, M., & Seidenberg, M. (2006). Children with new-onset epilepsy: Neuropsychological status and brain structure. *Brain: A Journal of Neurology, 129*(10), 2609-2619. doi:10.1093/brain/awl196

Hidi, S., & Boscolo, P. (2006). Motivation and writing. In J. Fitzgerald (Ed.), *Handbook of writing research.* (pp. 144-157). New York, NY US: Guilford Press.

Jacobson, L. T., & Reid, R. (2012). Improving the writing performance of high school students with attention Deficit/Hyperactivity disorder and writing difficulties. *Exceptionality, 20*(4), 218-234.

Jalava, M., Sillanpää, M., Camfield, C., & Camfield, P. (1997). Social adjustment and competence 35 years after onset of childhood epilepsy: A prospective controlled study. *Epilepsia, 38*(6), 708-715.

Johnston, J. M., & Pennypacker, H. S. (1993). *Strategies and tactics of behavioral research (2nd ed.)*. Hillsdale, NJ England: Lawrence Erlbaum Associates, Inc.

Johnston, J. A., Rees, M. I., & Smith, P. E. M. (2009). Epilepsy genetics: Clinical beginnings and social consequences. *QJM: Monthly Journal of the Association of Physicians, 102*(7), 497-499. doi:10.1093/qjmed/hcp019

Just, M. A., & Carpenter, P. A. (2002). A capacity theory of comprehension: Individual differences in working memory. In C. M. Seifert (Ed.), *Cognitive modeling.* (pp. 131-177). Cambridge, MA US: MIT Press.

Juzwik, M. M., Curcic, S., Wolbers, K., Moxley, K. D., Dimling, L. M., & Shankland, R. K. (2006). Writing into the 21st century: An overview of research on writing, 1999 to 2004. *Written Communication, 23*(4), 451-476.

Kaufer, D. S., Hayes, J.R., and Flower, L.S. (1986). Composing written sentences. *Research in the Teaching of English, 20*(2), 121-40.

Kazdin, A. E. (2011). *Single-case research designs : Methods for clinical and applied settings* (2nd ed ed.). New York: Oxford University Press.

Kellogg, R. T. (2001). Competition for working memory among writing processes. *The American Journal of Psychology, 114*(2), pp. 175-191.

Klassen, R. (2002). Writing in early adolescence: A review of the role of self-efficacy beliefs. *Educational Psychology Review, 14*(2), 173-203. doi:10.1023/A:1014626805572

LaBerge, D., & Samuels, S. J. (1974). Toward a theory of automatic information processing in reading. *Cognitive Psychology, 6*(2), 293-323. doi: 10.1016/0010-0285(74)90015-2

Lane, K. L., Harris, K. R., Graham, S., Weisenbach, J. L., Brindle, M., & Morphy, P. (2008). The effects of self-regulated strategy development on the writing performance of second-grade students with behavioral and writing difficulties. *The Journal of Special Education, 41*(4), 234-253. doi:10.1177/0022466907310370

Lezak, M. D. (1983). Neuropsychological assessment. New York, NY US: Oxford University Press.

Lezak, M. D., Howieson, D. B., Loring, D. W., Hannay, H. J., & Fischer, J. S. (2004). *Neuropsychological assessment (4th ed.)*. New York, NY US: Oxford University Press.

Licht, B. G. (1992). The achievement-related perceptions of children with learning problems: A developmental analysis. In D. H. Schunk, & J. L. Meece (Eds.), (pp. 247-264). Hillsdale, NJ England: Lawrence Erlbaum Associates, Inc.

Lienemann, T. O., & Reid, R. (2008). Using self-regulated strategy development to improve expository writing with students with attention deficit hyperactivity disorder. *Exceptional Children, 74*(4), 471-486.

Logan, J. A. R., Schatschneider, C., & Wagner, R. K. (2011). Rapid serial naming and reading ability: The role of lexical access. *Reading and Writing, 24*(1), 1-25. doi:10.1007/s11145-009-9199-1

MacArthur, C. A. (.)., Graham, S. (.)., & Fitzgerald, J. (.). (2006). In Fitzgerald J. (Ed.), *Handbook of writing research*. New York, NY US: Guilford Press.

MacArthur, C. A., & Graham, S. (1987). Learning disabled students' composing under three methods of text production: Handwriting, word processing, and dictation. *Journal of Special Education, 21*(3), 22-42.

Mason, L. H., Harris, K. R., & Graham, S. (2002). Every child has a story to tell: Self-regulated strategy development for story writing. *Education and Treatment of Children, 25*(4), 496-506.

Mason, L. H., Kubina, R. M., Jr., & Taft, R. J. (2011). Developing quick writing skills of middle school students with disabilities. *The Journal of Special Education, 44*(4), 205-220. doi:10.1177/0022466909350780

Mason, L. H., & Shriner, J. G. (2008). Self-regulated strategy development instruction for writing an opinion essay: Effects for six students with emotional/behavior disorders. *Reading and Writing, 21*(1-2), 71-93. doi:10.1007/s11145-007-9065-y

Matthews, W. S., Barabas, G., & Ferrari, M. (1982). Emotional concomitants of childhood epilepsy. *Epilepsia, 23*(6), 671-681.

McElveen, S. A., & Dierking, C. C. (2000). Children's books as models to teach writing skills. *The Reading Teacher, 54*, 362-364.

Milford, T., & Harrison, G. L. (2010). Using the PLEASE strategy with a struggling middle school writer with a disability. *Intervention in School and Clinic, 45*(5), 326-332.

Morphy, P., & Graham, S. (2012). Word processing programs and weaker writers/readers: A meta-analysis of research findings. *Reading and Writing, 25*(3), 641-678, DOI: 10.1007/s11145-010-9292-5

Murphy, C. C., Trevathan, E., & Yeargin-Allsopp, M.(1995). Prevalence of epilepsy and epileptic seizures in 10-year-old children: Results from the metropolitan atlanta developmental disabilities study. *Epilepsia,* (36), 866-872.

Nicholls, J. G. (1978). The development of the concepts of effort and ability, perception of academic attainment, and the understanding that difficult tasks require more ability. *Child Development, 49*(3), 800-814. doi:10.2307/1128250

Nolan, M. A., Redoblado, M. A., Lah, S., Sabaz, M., Lawson, J. A., Cunningham, A. M., Bye, A. M. E. (2004). Memory function in childhood epilepsy syndromes. *Journal of Paediatrics and Child Health, 40*(1-2), 20-27. doi:10.1111/j.1440-1754.2004.00284.x

Northcott, E., Connolly, A. M., Berroya, A., McIntyre, J., Christie, J., Taylor, A., Bye, A. M. E. (2007). Memory and phonological awareness in children with benign rolandic epilepsy compared to a matched control group. *Epilepsy Research, 75*(1), 57-62. doi:10.1016/j.eplepsyres.2007.04.004

Northcott, E., Connolly, A. M., Berroya, A., Sabaz, M., McIntyre, J., Christie, J., Bye, A. M. E. (2005). The neuropsychological and language profile of children with benign rolandic epilepsy. *Epilepsia, 46*(6), 924-930. doi:10.1111/j.1528-1167.2005.62304.x

Northcott, E., Connolly, A. M., Mclntyre, J., Christie, J., Berroya, A., Taylor, A., Bye, A. M. E. (2006). Longitudinal assessment of neuropsychologic and language function in children with benign rolandic epilepsy. *Journal of Child Neurology, 21*(6), 518-522.

Olson, R., Wise, B., Conners, F., Rack, J., & Fulker, D. (1989). Specific deficits in component reading and language skills: Genetic and environmental influences. *Journal of Learning Disabilities, 22*(6), 339-348.

Pajares, F., Johnson, M.J., & Usher, E.L. (2007). Sources of Writing Self-Efficacy Beliefs of Elementary, Middle, and High School Students. *Research in the Teaching of English, 42*(1), 104-120.

Pajares, F., Miller, M. D., & Johnson, M. J. (1999). Gender differences in writing self-beliefs of elementary school students. *Journal of Educational Psychology, 91*(1), 50-61. doi:10.1037/0022-0663.91.1.50

Pajares, F., & Valiante, G. (1997). Influence of self-efficacy on elementary students' writing. *Journal of Educational Research, 90*(6), 353-360.

Pajares, M. F., & Johnson, M. J. (1993). *Confidence and competence in writing: The role of self-efficacy, outcome expectancy, and apprehension.* Paper presented at the Annual Meeting of the American Educational Research Association (Atlanta, GA, April 12-16, 1993.

Papavasiliou, A., Mattheou, D., Bazigou, H., Kotsalis, C., & Paraskevoulakos, E. (2005). Written language skills in children with benign childhood epilepsy with centrotemporal spikes. *Epilepsy & Behavior, 6*(1), 50-58. doi:10.1016/j.yebeh.2004.09.008

Pascalicchio, T. F., de, A. F., da, S. N., Lin, K., Caboclo, L. O. S. F., Vidal-Dourado, M., Yacubian, E. M. T. (2007). Neuropsychological profile of patients with juvenile myoclonic epilepsy: A controlled study of 50 patients. *Epilepsy & Behavior, 10*(2), 263-267. doi:10.1016/j.yebeh.2006.11.012

Pavone, P., Bianchini, R., Trifiletti, R. R., Incorpora, G., Pavone, A., & Parano, E. (2001). Neuropsychological assessment in children with absence epilepsy. *Neurology, 56*(8), 1047-1051.

Paz, D. L., & Graham, S. (1997). Effects of dictation and advanced planning instruction on the composing of students with writing and learning problems. *Journal of Educational Psychology, 89*(2), 203-22.

Paz, D. L., & Graham, S. (1997). Strategy instruction in planning: Effects on the writing performance and behavior of students with learning difficulties. *Exceptional Children, 63*(2), 167-81.

Pennington, B. F. (1997). Dimensions of executive functions in normal and abnormal development. In N. A. Krasnegor, G. R. Lyon, P. S. Goldman-Rakic, N. A. Krasnegor, G. R. Lyon & P. S. Goldman-Rakic (Eds.), *Development of the prefrontal cortex: Evolution, neurobiology, and behavior.* (pp. 265-281). Baltimore, MD US: Paul H Brookes Publishing.

Perfetti, C. A., & McCutchen, D. (1987). Schooled language competence: Linguistic abilities in reading and writing. In S. Rosenberg (Ed.), *Advances in applied psycholinguistics, vol. 1: Disorders of first-language development; vol. 2: Reading, writing, and language learning.* (pp. 105-141). New York, NY US: Cambridge University Press.

Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. R. Pintrich & M. Zeidner (Eds.), (pp. 451-502). San Diego, CA US: Academic Press. doi:10.1016/B978-012109890-2/50043-3

Reid, R., & Lienemann, T. O. (2006). Self-regulated strategy development for written expression with students with attention Deficit/Hyperactivity disorder. *Exceptional Children, 73*(1), 53-68.

Rogers, L. A., & Graham, S. (2008). A meta-analysis of single subject design writing intervention research. *Journal of Educational Psychology, 100*(4), 879-906.

Rogers, L. A., & Graham, S. (2008). A meta-analysis of single subject design writing intervention research. *Journal of Educational Psychology, 100*(4), 879-906. doi:10.1037/0022-0663.100.4.879

Santangelo, T., Harris, K. R., & Graham, S. (2008). Using self-regulated strategy development to support students who have 'trubol giting thangs into werds.'. *Remedial and Special Education, 29*(2), 78-89. doi:10.1177/0741932507311636

Savage, R. S., & Frederickson, N. (2006). Beyond phonology: What else is needed to describe the problems of below-average readers and spellers? *Journal of Learning Disabilities, 39*(5), 399-413. doi:10.1177/00222194060390050301

Schouten, A., Oostrom, K. J., Pestman, W. R., Peters, A. C. B., & Jennekens-Schinkel, A. (2002). Learning and memory of school children with epilepsy: A prospective controlled longitudinal study. *Developmental Medicine and Child Neurology, 44*(12), 803-811.

Schunk, D. H., & Swartz, C. W. (1993). Goals and progress feedback: Effects on self-efficacy and writing achievement. *Contemporary Educational Psychology, 18*(3), 337-354. doi:10.1006/ceps.1993.1024

Schunk, D. H., & Zimmerman, B. J. (1994). In Schunk D. H., Zimmerman B. J. (Eds.), *Self-regulation of learning and performance: Issues and educational applications*. Hillsdale, NJ England: Lawrence Erlbaum Associates, Inc.

Scruggs, T. E., & Mastropieri, M. A. (1998). Summarizing single-subject research: Issues and applications. *Behavior Modification, 22*(3), 221-42.

Seidenberg, M., Beck, N., Geisser, M., Giordani, B., Sackellares, J. C., Berent, S., Boll, T. J. (1986). Academic achievement of children with epilepsy. *Epilepsia, 27*(6), 753-759.

Semrud-Clikeman, M., Guy, K., Griffin, J. D., & Hynd, G. W. (2000). Rapid naming deficits in children and adolescents with reading disabilities and attention deficit hyperactivity disorder. *Brain and Language, 74*(1), 70-83. doi:10.1006/brln.2000.2337

Semrud-Clikeman, M., & Harder, L. (2011). Neuropsychological correlates of written expression in college students with ADHD. *Journal of Attention Disorders, 15*(3), 215-223.

Shell, D. F., Colvin, C., & Bruning, R. H. (1995). Self-efficacy, attribution, and outcome expectancy mechanisms in reading and writing achievement: Grade-level and achievement-level differences. *Journal of Educational Psychology, 87*(3), 386-398. doi:10.1037/0022-0663.87.3.386

Stanovich, K. E. (1986). Cognitive processes and the reading problems of learning disables children: Evaluating the assumptions of specificity. In J. K. Torgesen, & B. Y. Wong (Eds.), *Psychological and educational perspectives on learning disabilities* (pp. 85-159). Orlando FL: Academic Press.

Stanovich, K. E., & West, R. F. (1989). Exposure to print and orthographic processing. *Reading Research Quarterly, 24*(4), 402-33.

Swanson, H. L. (1999a). Reading comprehension and working memory in learning disabled readers: Is the phonological loop more important than the executive system? *Journal of Experimental Child Psychology*, 72,1–31.

Swanson, H. L., & Ashbaker, M. (2000). Working memory, short-term memory, speech rate, word recognition, and reading comprehension in learning disabled readers: Does the executive system have a role? *Intelligence*, 28, 1–30.

Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. *Cognitive Science: A Multidisciplinary Journal, 12*(2), 257-285.

Thomson, J. B., Chenault, B., Abbott, R. D., Raskind, W. H., Richards, T., Aylward, E., & Berninger, V. W. (2005). Converging evidence for attentional influences on the orthographic word form in child dyslexics. *Journal of Neurolinguistics, 18*(2), 93-126. doi:10.1016/j.jneuroling.2004.11.005

Troia, G. A., & Graham, S. (1999). Teaching students with learning disabilities to mindfully plan when writing. *Exceptional Children*, *65*(2), 235-252.

Tromp, S. C., Weber, J. W., Aldenkamp, A. P., Arends, J., vander Linden, I., & Diepman, L. (2003). Relative influence of epileptic seizures and of epilepsy syndrome on cognitive function. *Journal of Child Neurology, 18*(6), 407-412. doi:10.1177/08830738030180060501

Vanasse, C. M., Béland, R., Jambaqué, I., Lavoie, K., & Lassonde, M. (2003). Impact of temporal lobe epilepsy on phonological processing and reading: A case study of identical twins. *Neurocase, 9*(6), 515-522. doi:10.1076/neur.9.6.515.29377

Wagner, R. K., & Torgesen, J. K. (1987). The nature of phonological processing and its causal role in the acquisition of reading skills. *Psychological Bulletin, 101*(2), 192-212. doi:10.1037/0033-2909.101.2.192

Wagner, R.K., Torgesen, J., Rashotte, C., and Pearson, N.A. (1999). Comprehensive test of phonological processing. Austin, TX: Pro-Ed.

Welch, M. (1992). The please strategy: A metacognitive learning strategy for improving the paragraph writing of students with mild learning disabilities. *Learning Disability Quarterly, 15*(2), 119-128. doi:10.2307/1511013

Welsh, M. C., Pennington, B. F., & Groisser, D. B. (1991). A normative-developmental study of executive function: A window on prefrontal function in children. *Developmental Neuropsychology, 7*(2), 131-149. doi:10.1080/87565649109540483

Westbrook, L. E., Silver, E. J., Coupey, S. M., & Shinnar, S. (1991). Social characteristics of adolescents with idiopathic epilepsy: A comparison to chronically ill and nonchronically ill peers. *Journal of Epilepsy, 4*(2), 87-94. doi:10.1016/S0896-6974(05)80066-0

Williams, J., Griebel, M. L., & Dykman, R. A. (1998). Neuropsychological patterns in pediatric epilepsy. *Seizure: The Journal of the British Epilepsy Association, 7*(3), 223-228.

Williams, J., Phillips, T., Griebel, M. L., Sharp, G. B., Lange, B., Edgar, T., & Simpson, P. (2001). Patterns of memory performance in children with controlled epilepsy onthe CVLT-C. *Child Neuropsychology, 7*(1), 15.

Williams, J., & Sharp, G. B. (2000). Epilepsy. In K. O. Yeates, M. D. Ris, H. G. Taylor, K. O. Yeates, M. D. Ris & H. G. Taylor (Eds.), *Pediatric neuropsychology: Research, theory, and practice.* (pp. 47-73). New York, NY US: Guilford Press.

Williams, J., Sharp, G., Bates, S., & Griebel, M. (1996). Academic achievement and behavioral ratings in children with absence and complex partial epilepsy. *Education & Treatment of Children, 19*(2), 143-152.

Winne, P. H., & Hadwin, A. F. (1998). Studying as self-regulated learning. In D. J. Hacker, J. Dunlosky & A. C. Graesser (Eds.), (pp. 277-304). Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.

Wirrell, E. C. (1998). Benign epilepsy of childhood with centrotemporal spikes. *Epilepsia, 39 Suppl 4,* S32-S41.

Wolf, M. (1986). Rapid alternating stimulus naming in the developmental dyslexias. *Brain and Language, 27*(2), 360-379. doi:10.1016/0093-934X(86)90025-8

Wolf, M. (1991). Naming speed and reading: The contribution of the cognitive neurosciences. *Reading Research Quarterly, 26*(2), 123-141. doi:10.2307/747978

Wolf, M., & Bowers, P. G. (1999). The double-deficit hypothesis for the developmental dyslexias. *Journal of Educational Psychology, 91*(3), 415-438. doi:10.1037/0022-0663.91.3.415

Wolf, M., & Denckla, E.S. (2005). Rapid automatized naming and rapid alternating stimulus tests. Austin, TX: Pro-Ed.

Wong, B. Y. L., Hoskyn, M., Jai, D., Ellis, P., & Watson, K. (2008). The comparative efficacy of two approaches to teaching sixth graders opinion essay writing. *Contemporary Educational Psychology, 33*(4), 757-784. doi:10.1016/j.cedpsych.2007.12.004

Zimmerman, B. J., & Risemberg, R. (1997). Becoming a self-regulated writer: A social cognitive perspective. *Contemporary Educational Psychology, 22*(1), 73.

Zumbrunn, S. K. (2011). *Nurturing young students' writing knowledge, self-regulation, attitudes, and self-efficacy: The effects of self-regulated strategy development.* ProQuest Information & Learning). *Dissertation Abstracts International Section A: Humanities and Social Sciences, 71*(8-). (2011-99030-296).

Appendix

Appendix A
Participant Consent Form

Participant Consent Form

Project Title: Investigating the Effectiveness of a SRSD Writing Intervention for Students with Epilepsy

Investigators:
Kristin Sinclair, M.A. Candidate, B.Ed. (Graduate Student, Department of Educational Psychology & Leadership Studies, University of Victoria)
Gina L. Harrison, Ph.D., R.Psych. (Faculty Member, Department of Educational Psychology & Leadership Studies, University of Victoria)

Project Purpose and Objectives:
We would like you to help us with a project we are working on at the University. We want to know how we can help children with epilepsy learn to be better writers. We will be doing some reading, writing, and language games together. After that, we will be working in small groups to learn how to write good paragraphs.

Project Details and Procedures:
If you agree that you would like to participate in this research, you will work one-on-one with a researcher in a research office (MacLaurin A423) at the University of Victoria. You will be asked to do some sound games, memory activities, spelling and word reading tasks, and will be asked to write a short paragraph. One session of about 30-45 minutes is required. After this, you will take part in a 30 minute writing intervention each week during the *Tools for Success* program for ten weeks. This research will take some time and some things will be easy for you, and other things might be very hard. You will be doing lots of activities that are like what you do at school, and you might get tired. You will get to work with the researcher on your own and in small groups on different writing activities. By participating in this research, you will also help us learn how to help children with epilepsy learn to write. Only children whose parents agree to let them participate and who also want to participate will take part. You do not need to participate in this study, and it will have no affect on your work with Tools for Success. If you decide you do want to participate, you are allowed to stop at any time and neither the researcher nor your parents will mind. If you decide you do not want to participate anymore we will shred all your activities so no one will see them.

Anonymity and Confidentiality:
This study will be conducted by Kristin Sinclair and all information of the study confidential, or secret. This form will be the only one with your name on it, and will be kept in a locked cabinet. All other forms will have a secret code on them. Only Kristin Sinclair or Dr. Gina Harrison will have access to the information. Since you will be participated in the Tools for Success program, other children in the program will know if you participate or not. When the results of the research are written up, it might be possible for someone to guess that you participated, but your name will not be used.

Research Data:
The results of this study may be shared in the following ways:
published articles; thesis/dissertation/class presentations; presentations at professional conferences; in-service and professional development workshops.
Data from this study will be disposed of after a period of 1 year. Paper copies will be shredded and electronic data will be erased.

Contacts:
Kristin Sinclair is the Principal Investigator and the main contact person regarding this study. Kristin may be reached at 250-721-7211, E-mail: kdegros@uvic.ca.

In addition to being able to contact the researcher at the above phone number and e-mail, you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Human Research Ethics Office at the University of Victoria (250-472-4545 or ethics@uvic.ca).

Consent:
Your signature below indicates that you understand the above conditions of participation in this study and that you were able to have any questions answered by the researcher.

I would like to participate in the project entitled: **Investigating the Effectiveness of a SRSD Writing Intervention for Students with Epilepsy**

_____	_____	_____
Name	*Signature*	*Date*

Keep one copy of the consent form, and return the signed copy back to Kristin Sinclair.

Appendix B
Self-Efficacy Questionnaire

Directions: On a scale from 10 (not sure) to 100 (real sure), how sure are you that you can perform each of the writing skills below?

Write a paragraph including all the important parts?

10	20	30	40	50	60	70	80	90	100
Not sure			Maybe			Pretty sure			Real sure

Include a topic sentence in your paragraph?

10	20	30	40	50	60	70	80	90	100
Not sure			Maybe			Pretty sure			Real sure

Write details in your paragraph?

10	20	30	40	50	60	70	80	90	100
Not sure			Maybe			Pretty sure			Real sure

Give examples to support your idea?

10	20	30	40	50	60	70	80	90	100
Not sure			Maybe			Pretty sure			Real sure

Write a good conclusion to your paragraph?

10	20	30	40	50	60	70	80	90	100
Not sure			Maybe			Pretty sure			Real sure

Write a paragraph that convinces a reader of your point of view?

10	20	30	40	50	60	70	80	90	100
Not sure			Maybe			Pretty sure			Real sure

Write a good paragraph?

10	20	30	40	50	60	70	80	90	100
Not sure			Maybe			Pretty sure			Real sure

Appendix C Paragraph Prompts

Baseline	
	My favourite game is…
	If I were the teacher, I would…
	My favourite day of the week is…
Instructional	
	My favourite time of the year is…
	What I like about where I live…
	My favourite vacation was…
	What I did on March Break
	My dream house
	If I had super-powers…
	If I had a million dollars…
	I'd like to invent a machine that…
Independent	
	On a rainy day, I like to…
	My favourite holiday is…
Maintenance	
	If I could do anything on my summer vacation, I would…

Appendix D Lesson Checklist

Lesson 1

- ☐ Introduce yourself
- ☐ Introduce and explain each part of PLEASE
    - Practice PLEASE until students know each part
- ☐ Discuss topic and concluding sentences
- ☐ What makes a good paragraph?
- ☐ Find paragraph parts in a paragraph -Terry Fox (topic sentence, ideas, details, concluding sentence)
- ☐ Review PLEASE and why it is important
- ☐ Lesson Wrap-up

Lesson 2

- ☐ Test PLEASE to see what participants remember
- ☐ Find parts in a second paragraph
    - Researcher writes each part on the graphic organizer
    - Talk about why you are taking notes
- ☐ Model using self-statements for "Pick my Idea"
    - Ask participants to come up with (and record) things they might say to help them come up with ideas
    - Discuss how participants have used self-statements in the past
- ☐ Model the entire process of writing a paragraph using PLEASE
- ☐ Discuss the self-statements that you used while you wrote the story
    - Participants should add possible self-statements to use in the future
- ☐ Introduce graphing sheet/Graph the story
- ☐ Lesson wrap-up

Lesson 3

- ☐ Instructional phase probe
- ☐ Test PLEASE to see if students remember parts and why each is important
- ☐ If necessary, practice finding parts in a paragraph and taking notes on the graphic organizer
- ☐ Review self-statements and why they are important
- ☐ Collaborative writing
    - Give participants blank graphic organizers
    - Ask participants to take out their self-statement lists
    - As a group, work through the PLEASE acronym, but have each participant write their own notes

- If necessary, remind participants what each letter in PLEASE stands for

- Individually, with help, participants write a paragraph
- Lesson wrap-up

Lesson 4

- Test PLEASE to see if participants remember parts and why each is important
- Establish prior performance
  - Using a baseline story, participants should read their stories and identify paragraph parts present
  - Compare the baseline paragraph to the paragraph written collaboratively
  - Discuss what the participants have learned about good paragraph writing
  - Review self-statements
  - Individually, with help, participants will write paragraph using their PLEASE sheet as a guide
  - As a group, discuss what you can do when you finish writing - COPS revision strategy
- Lesson wrap-up

Lesson 5

- Instructional phase probe
- Test PLEASE to see if participants remember parts and why each is important
- Introduce "Million Dollar Words" - words/phrases that we don't regularly use that add extra interest to our writing. Goal - for everyone to include at least one million dollar word in their paragraph today
- Individual collaborative writing
  - Give participants blank graphic organizers and ask them to take out their self-statement lists
  - Put out the prompt and begin the paragraph writing process (letting participants lead as much as possible)
  - Review PLEASE
  - Participants write individually
- Graph paragraph parts
- Lesson wrap-up

Lesson 6

- Test PLEASE to see if participants remember parts and why each is important

- Review goals set previously (words written, paragraph parts) and help participants set appropriate goals for today)
- Wean off graphic organizer
    - explain to participants that they won't usually have the PLEASE chart when they write stories, but they can make their own notes on blank paper
    - Model how to write down the PLEASE chart on scrap paper
- Individual collaborative writing
    - Give participants a blank piece of paper (instead of the graphic organizer) and ask them to take out their self-statements list
    - Put out the prompt and begin the writing process
- Participants review their work using the COPS strategy
- Graph paragraph parts/words written
- Lesson wrap-up

Lesson 7

- Instructional phase probe
- Test PLEASE to see if participants remember parts and why each is important
- Review goals set previously (words written, paragraph parts) and help participants set appropriate goals for today)
- Review self-statements
- Wean off graphic organizer
    - explain to participants that they won't usually have the PLEASE chart when they write stories, but they can make their own notes on blank paper
    - Model how to write down the PLEASE chart on scrap paper
- Individual collaborative writing
    - Give participants a blank piece of paper (instead of the graphic organizer) and ask them to take out their self-statements list
    - Put out the prompt and begin the writing process
- Participants review their work using the COPS strategy
- Graph paragraph parts/words written
- Lesson wrap-up

Lesson 8

- Test PLEASE to see if participants remember parts and why each is important
- Review goals set previously (words written, paragraph parts) and help participants set appropriate goals for today)
- Review self-statements
- Individual writing
    - Give participants a blank piece of paper (instead of the graphic organizer) and ask them to take out their self-statements list

- Put out the prompt and begin the writing process

- Participants review their work using the COPS strategy
- Graph paragraph parts/words written
- Lesson wrap-up

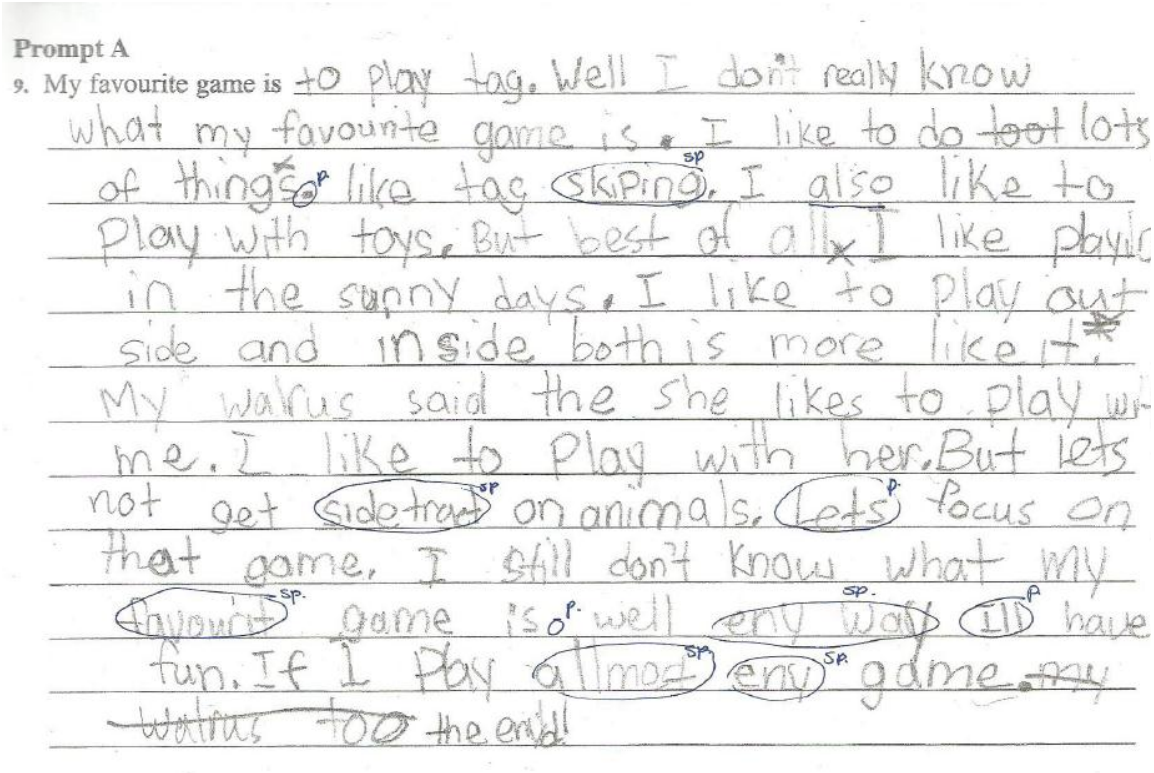
Lesson 9

- Instructional phase probe
- Test PLEASE to see if participants remember parts and why each is important
- Review goals set previously (words written, paragraph parts) and help participants set appropriate goals for today)
- Review self-statements
- Individual writing
    - Give participants a blank piece of paper (instead of the graphic organizer) and ask them to take out their self-statements list
    - Put out the prompt and begin the writing process
- Participants review their work using the COPS strategy
- Graph paragraph parts/words written
- Lesson wrap-up

Lesson 10

- Test PLEASE to see if participants remember parts and why each is important
- Review goals set previously (words written, paragraph parts) and help participants set appropriate goals for today)
- Review self-statements
- Individual writing
    - Give participants a blank piece of paper (instead of the graphic organizer) and ask them to take out their self-statements list
    - Put out the prompt and begin the writing process
- Participants review their work using the COPS strategy
- Graph paragraph parts/words written
- Lesson wrap-up

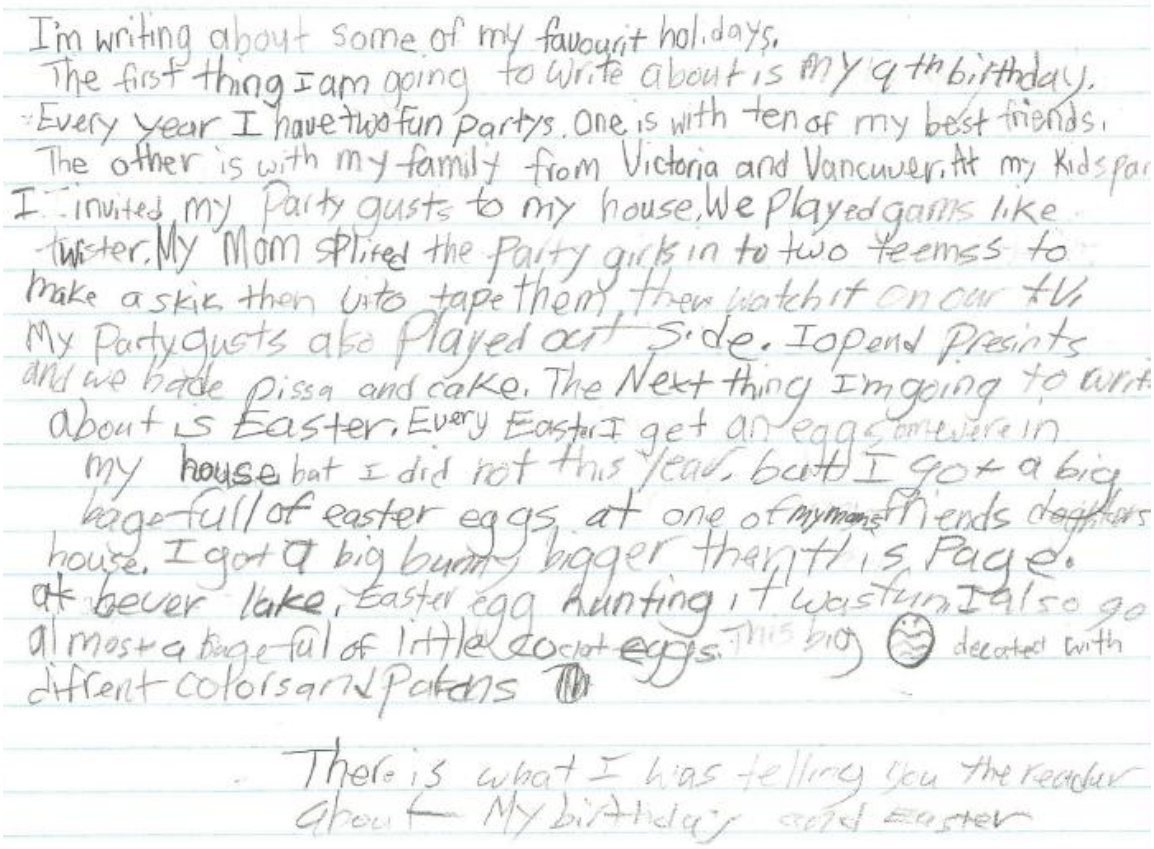
Appendix E Participants' Paragraphs



Prompt A

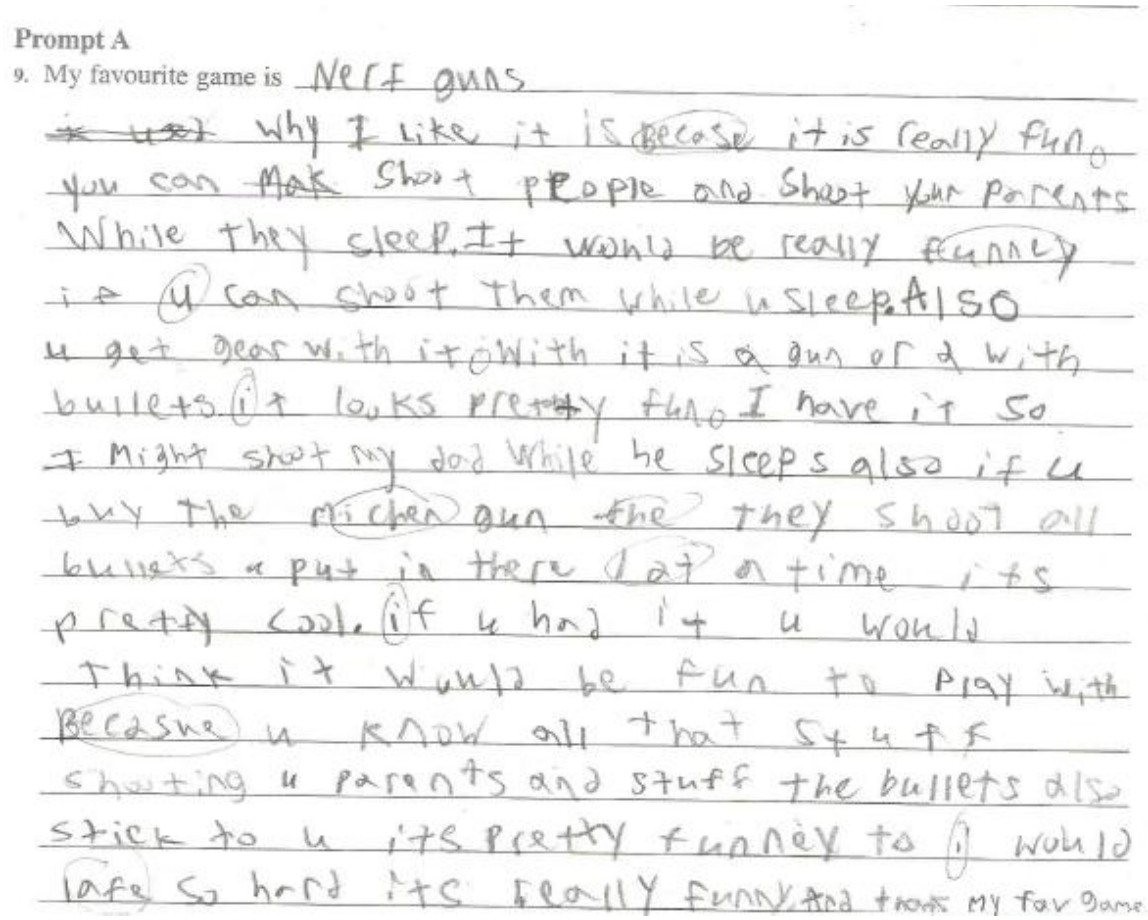
9. My favourite game is to play tag. Well I don't really know what my favourite game is. I like to do ~~toot~~ lots of things like tag skiping. I also like to play with toys. But best of all I like playi in the sunny days. I like to play out side and inside both is more like it. My walrus said the she likes to play wi me. I like to play with her. But lets not get sidetrack on animals. Lets focus on that game. I still don't know what my favourit game is well eny way I'll have fun. If I play allmost eny game. ~~my walrus too~~ the end!

Megan's paragraph, pre-intervention


I'm writing about some of my favourit holidays.
The first thing I am going to write about is my 9th birthday.
Every year I have two fun partys. One is with ten of my best friends.
The other is with my family from Victoria and Vancuver. At my Kids par
I invited my party gusts to my house. We played gams like
twister. My Mom splited the party girls in to two teems to
make a skit then I uto tape them, then watch it on our tV.
My Party gusts also played out side. I opend presints
and we hade pissa and cake. The Next thing I'm going to writ
about is Easter. Every Easter I get an egg somewere in
my house but I did not this year, butt I got a big
bage full of easter eggs at one of my moms friends daughters
house. I got a big bunny bigger then this Page.
at bever lake, Easter egg hunting it was fun I also go
almost a bage ful of little choclot eggs. This big decated with
difrent colors and Patens

There is what I was telling you the reader
about ← My birthday and Easter

Megan's paragraph, post-intervention

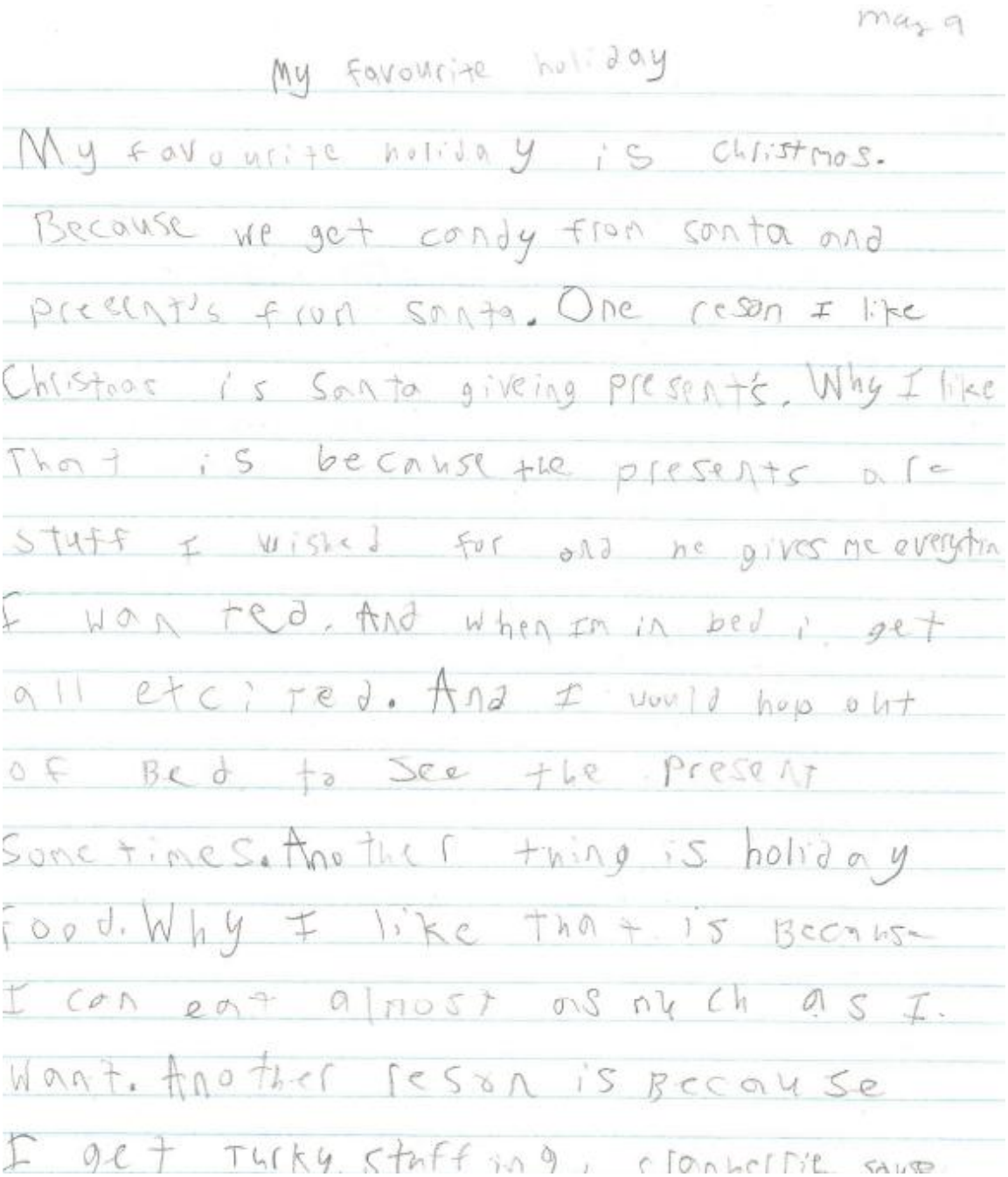


Prompt A

9. My favourite game is Nerf guns

~~u use~~ why I like it is because it is really fun. you can ~~Mak~~ Shoot people and Shoot your parents While they sleep. It would be really funnely if u can shoot them while u sleep. Also u get gear with it. With it is a gun or 2 with bullets. it looks ~~pretty~~ fun. I have it so I might shoot my dad while he sleeps also if u buy the nicken gun ~~the~~ they shoot all bullets u put in there 1 at a time its pretty cool. if u had it u would think it would be fun to play with Because u know all that stuff shooting u parents and stuff the bullets also stick to u its pretty funney to i would laf so hard its really funny. And that's my fav game

Laura's paragraph, pre-intervention

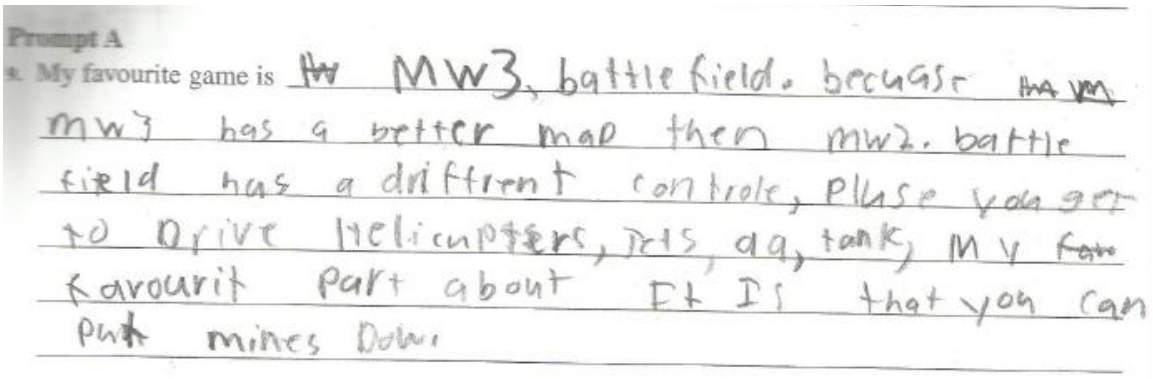


May 9

My favourite holiday

My favourite holiday is Christmas. Because we get candy from santa and presents from santa. One reson I like Christoas is Santa giveing presents. Why I like That is because the presents are stuff I wished for and he gives me everythin I wan red. And when Im in bed i get all etc; red. And I would hop out of Bed to see the present Sometimes. Another thing is holiday food. Why I like that is Becaus I can eat almost as much as I. Want. Another reson is Because I get Turky. stuff in 9, cranberrie sauce

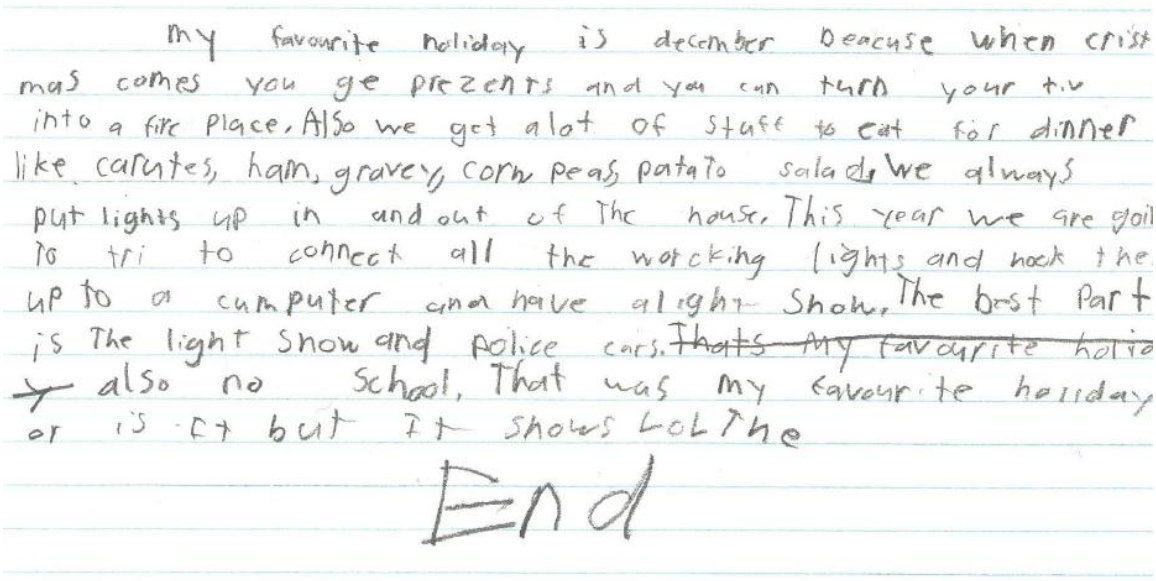
Laura's paragraph, post-intervention



Prompt A

My favourite game is ~~tw~~ MW3. battle field. because ~~tha wm~~ mw3 has a better map then mw2. battle field has a driffrent controle, Plase you get to Drive helicupters, Jets, ag, tank, M v ~~fave~~ favourit part about It Is that you can ~~put~~ mines Dow.

James' paragraph, pre-intervention



my favourite holiday is december Deacuse when crist mas comes you ge prezents and you can turn your tv into a fire place. Also we get alot of stuff to eat for dinner like carutes, ham, gravey, corn peas, pataTo salad, we always put lights up in and out of The house. This year we are goi to tri to connect all the watching lights and hook the up to a cumputer and have alight Show. The best Part is The light Show and police cars. ~~Thats My favurite holi~~ also no School, That was my favourite holiday or is it but It shows LoL The

End

James' paragraph, post-intervention