

An investigation of the effectiveness of TWA on reading comprehension of students with and at-risk for emotional and behavioral disorders

by

Sara Sanders

B.S., Kansas State University, 2012
M.S., Kansas State University, 2014

AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF EDUCATION

Department of Special Education, Counseling, and Student Affairs
College of Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2018

Abstract

Students with emotional and behavioral disorders frequently display deficits in reading. One emerging method for addressing these deficits is known as self-regulated strategy development (SRSD). One specific SRSD reading strategy is TWA (Think before reading, think While reading, and think After reading), which teaches students to self-monitor and self-evaluate while reading. The purpose of this study was to determine if TWA is effective in increasing reading comprehension of fourth, fifth, and sixth grade students with or at-risk for emotional and behavioral disorders, using a randomized control trial pretest-posttest design. Results suggested no statistical significance between the reading comprehension of the treatment and control group following the intervention. Limitations are discussed and suggestions for future research are presented.

An investigation of the effectiveness of TWA on reading comprehension of students with and at-risk for emotional and behavioral disorders

by

Sara Sanders

B.S., Kansas State University, 2012
M.S., Kansas State University, 2014

A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF EDUCATION

Department of Special Education, Counseling, and Student Affairs
College of Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2018

Approved by:

Major Professor
Mickey Lee Losinski

Copyright

© SaraSanders2018.

Abstract

Students with emotional and behavioral disorders frequently display deficits in reading. One emerging method for addressing these deficits is known as self-regulated strategy development (SRSD). One specific SRSD reading strategy is TWA (Think before reading, think While reading, and think After reading), which teaches students to self-monitor and self-evaluate while reading. The purpose of this study was to determine if TWA is effective in increasing reading comprehension of fourth, fifth, and sixth grade students with or at-risk for emotional and behavioral disorders, using a randomized control trial pretest-posttest design. Results suggested no statistical significance between the reading comprehension of the treatment and control group following the intervention. Limitations are discussed and suggestions for future research are presented.

Table of Contents

List of Figures	x
List of Tables	xi
Acknowledgements.....	xii
Dedication	xiii
Chapter 1 - Introduction.....	1
Students with Emotional and Behavioral Disorders	1
Academic Characteristics of Students with EBD.	2
Students with EBD and Reading.....	3
Academic Interventions for Students with EBD.....	4
Rationale	5
Purpose.....	7
Chapter 2 - Review of Literature	9
Self-Regulated Strategy Development.....	9
Stage 1: Develop Background Knowledge	11
Stage 2: Discuss It.....	11
Stage 3: Model It.....	11
Stage 4: Memorize It.....	12
Stage 5: Support It.....	12
Stage 6: Independent Performance	13
Self-Regulation	13
Self-Monitoring.....	14
Goal Setting	15
Self-Instructions	15
Self-Reinforcement	16
Think Before, Think While, Think After Reading (TWA).....	17
TWA Steps.....	17
TWA Lessons.....	19
TWA.	19
Lesson 1.	19

Lesson 2.	20
Lesson 3.	20
Lesson 4.	21
Lesson 5.	21
Lesson 6.	22
Previous Reviews.....	22
SRSD Literature Review	24
Coding Procedures:.....	26
Participants and Setting.....	26
Design.....	26
Outcome Measures.....	27
Publication bias.....	30
Quality of study.....	31
Results.....	32
Participants.....	35
Setting.....	35
Design Features.....	35
Quality Indicators.....	36
Effects of Studies	38
Additional analysis.....	39
Publication Bias	39
Discussion.....	40
Effects of SRSD Reading Comprehension Strategies	41
Impact of Independent Variables and Participants	41
SRSD and the CEC (2014) Standards for Evidence-Based Practices.....	42
Limitations	43
Implications for Future Research.....	44
Conclusion	45
Chapter 3 - Method.....	46
Experimental Design.....	46
Setting, Participants, and Materials	47

Setting.....	47
Participants.....	49
Student participants.....	49
Adult participants.....	50
Materials.....	50
Outcome Measures.....	51
Reading Comprehension Probes.....	52
FastBridge Benchmarks.....	53
DIBELS Daze.....	54
Interobserver agreement.....	55
Procedures.....	55
Control Group.....	56
Treatment Group.....	57
Treatment Fidelity.....	59
Social Validity.....	60
Goal.....	60
Effects.....	60
CURP.....	61
Chapter 4 - Results.....	63
Social Validity.....	64
CURP.....	64
Goal.....	65
Chapter 5 - Discussion.....	66
Limitations of the Study.....	68
Implications for Practice.....	71
Recommendations for Future Research.....	72
Conclusion.....	74
References.....	75
Appendix A - Lesson Plan Checklists.....	91
Appendix B - Lesson Materials.....	106
Appendix C – Reading Passages.....	108

Appendix D Social Validity Survey 113

List of Figures

Figure 2.1 Article Flowchart.....	33
Figure 2.2 CEC Quality Indicators	37

List of Tables

Table 2.1 Study Characteristics	34
Table 2.2 Effect Sizes	38
Table 2.3 SCD Effect Sizes	39
Table 2.4 Publication Bias	40
Table 3.1- Student Characteristics	49
Table 4.1 Descriptive Statistics.....	63
Table 4.2 Univariate F Scores.....	64

Acknowledgements

I would like to first thank my advisor, Dr. Mickey Losinski for his guidance and advice over the last three years. You were the first person to suggest I start this journey, and I am grateful for all your help and support along the way. Thank you.

I would also like to thank Dr. Robin Parks Ennis for serving on my committee and for her guidance and advice over the past two years.

Thank you also to Dr. Jessica Lane, Dr. Jim Teagarden, and Dr. Warren White for serving on my committee.

Finally, I want to thank my family, friends, and co-workers. I am truly blessed to have such a wonderful, supportive group of people in my life and I am thankful for every one of you.

Dedication

To my family: mom, dad, and Staci. Thank you for your unwavering love and support.

Chapter 1 - Introduction

This chapter offers a discussion regarding the challenges faced by students with emotional and behavioral disorders (EBD) and academic interventions for their needs. First, an overview of characteristics of students with EBD will be provided, with the focus on their often overlooked academic deficits. Next, research into potential academic interventions will be outlined and discussed. Finally, the rationale of the current study will be described, accompanied by the study's purpose and research questions.

Students with Emotional and Behavioral Disorders

It is difficult to establish just how many students in the U.S. are diagnosed with EBD, whose inclusion criteria encompasses a number of different disorders that impact student behavior and emotional well-being (Kauffman & Landrum, 2018). Currently, less than 1% of students qualify to receive special education services for an emotional disturbance (US Department of Education, 2016), which is the classification under the Individuals with Disabilities Education Act (IDEA, 2004) where the majority of students with EBD are provided special education services. However, the number of students served for an emotional disturbance is much lower than the estimated 5-6% of students who have moderate to severe EBD (Forness, Freeman, Paprella, Kauffman, & Walker, 2012). Students with EBD exhibit disproportionately high levels of inappropriate behaviors such as noncompliance, defiance, disrespect, and aggression and struggle to maintain appropriate relationships with peers and adults (Cullinan & Sabornie, 2004; Gresham, Lane, MacMillian, & Bocian, 1999; Kauffman & Landrum, 2018; Landrum, Tankersley, Kauffman, 2003). The struggles these students face at school is well documented in the literature. Students with EBD tend to earn lower grades, fail more classes, and hold the highest dropout rate of any other special education disability group (Kaufman, Alt, &

Chapman, 2001; Landrum et al., 2003; Wagner, Kutash, Duchnowski, Epstein, & Sumi, 2005). Additionally, these students are more likely to have been the subject of disciplinary action, such as suspension or expulsion, and are more likely to have moved schools due to a change in placement (Wagner et al., 2005). Overall, these students tend to have a less positive, successful school experience compared to their typically developing peers (Landrum et al., 2003). Students with EBD continue to struggle following high school with increased rates of incarceration, lower rates of post-secondary education, and lower levels of employment (Bullis & Cheney, 1999; Carter & Wehby, 2003; Wagner, 1995).

Academic Characteristics of Students with EBD.

Unsurprisingly, students with EBD frequently display academic deficits across subject areas (Ennis, Evanovich, Losinski, Jolivette, & Kimball, 2017; Trout, Nordess, Pierce, & Epstein, 2003; Wagner, 1995). Students with EBD tend to begin struggling with academics early in their schooling, with the difficulties continuing throughout their education (Reid, Gonzalez, Nordness, Trout, & Epstein, 2004; Rosenblatt & Rosenblatt, 1999; Wagner, 1995). Many students with EBD function at least one to two years below grade level as compared to their general education peers (Lane, Barton-Arwood, Nelson, & Wehby, 2008; Reid et al., 2004; Trout et al., 2003). Specifically, the meta-analysis conducted by Reid and colleagues (2004) indicated a significant difference between the academic functioning of students with EBD and their non-identified peers, with 75% of students with EBD scoring below the mean of the comparison group in all academic areas; the overall mean achievement of students with EBD fell in the 25th percentile.

In the past, this lack of academic success was often attributed to the behavioral deficits and excesses that define students with EBD. More recently, it has been acknowledged that

students with EBD often present with co-morbid learning disabilities (LD), which compounded with behavioral challenges, can lead to severe academic deficits (Mattison & Blader, 2013; Nelson, Benner, Neill, & Stage, 2006). Often the “learning profiles” of students with EBD look very similar to students with LD (Burke, Boon, Hatton, & Bowman-Perrott, 2015; Carter, Lane, Peirson, & Glaeser, 2006; Nelson, Benner, Lane & Smith, 2004). Exact numbers of students with co-morbid diagnoses are difficult to establish with certainty, but because academic underachievement is one criteria for the federal definition of an emotional disturbance, it is likely that the number is significant (Lane et al., 2008; Reid et al., 2004). Despite the reasons for academic deficits, it is evident students with EBD would benefit from the development and implementation of evidence-based practices to support academic instruction (Maggin, Wehby, & Gilmour, 2016).

Students with EBD and Reading.

Reading is one academic area in which students with EBD often face significant struggles (Burke et al., 2015). Wagner and colleagues (2005) discovered that over 60% of students with EBD score in the bottom quartile in reading, which is almost identical to other disability classifications such as autism spectrum disorder and intellectual disabilities. Another study found both elementary and secondary students scored below the 25th percentile in reading, with reading comprehension scores decreasing for secondary students (Lane et al., 2008). Finally, a study conducted by Siperstein, Wiley, and Forness (2011) followed the academic growth of students with or at risk for EBD, finding no significant growth in reading skills at the end of the school year.

Evidence of academic deficits in reading has far reaching implications for students with EBD. Reading is arguably one of the most important skills students need to succeed in school

and in life. Poor reading ability prevents students from understanding information through text, a skill that becomes increasingly important as students move through school (Burke et al., 2015). As students reach middle and high school, the amount of required reading increases, and the text becomes more complex and difficult, particularly in the subjects of science and social studies (Mason & Hedin, 2011; Saenz & Fuchs, 2002). The increased amount of expository text students are required to read and gather information from generally uses a more complex text structure, has greater conceptual density, and has a higher rate of vocabulary words (Fang, 2006; Mason & Hedin, 2001). Due to the fact students with EBD already read at a lower level than their peers, they often require more intensive instruction to make progress in reading (Burke et al., 2015).

Academic Interventions for Students with EBD.

Traditionally, interventions for students with EBD have focused on decreasing the high levels of inappropriate behaviors (e.g. noncompliance, disrespect, aggression), with the rationale that improved student behavior would positively impact academic progress (Clark, Dunlap, & Stichter, 2002; Dunlap & Childs, 1996; Ruhl & Berlinghoff, 1992). As a result, there was little rigorous academic instruction for students with EBD and few interventions designed to improve the limited academic skills of these students (Barton-Arwood, Wehby, & Falk, 2005). However, recent research has highlighted the importance of implementing concurrent behavioral and academic interventions to address all needs of students with EBD (Mattison & Blader, 2013; Wehby, Lane, & Falk, 2003). Once students with EBD begin struggling academically, it does not appear these academic deficits are remediated without some type of intervention (Wehby et al., 2003). For example, students who demonstrate below grade level reading skills by the end of second grade tend to display consistently low reading scores throughout their education (Coutinho, 1986; O'Shaughnessy, Lane, Gresham, & Beebe-Frankenberger, 2002). Evidence of

persistent academic difficulties necessitates the development of empirically validated interventions to meet the academic needs of students with EBD (Lane, Wehby, & Barton-Arwood, 2005).

Despite the evidence supporting the use of academic interventions with students with EBD, there are still limitations surrounding the current research (Wehby, Falk, Barton-Arwood, Lane & Cooley, 2003; Wehby et al., 2003; Vannest, Temple-Harvey, & Mason, 2008). One limitation to the current evidence-base was highlighted by Vannest and colleagues (2008) in a review of single-case design studies examining effective academic interventions for students with EBD. They noted the majority of the studies conducted included in the review were in self-contained classrooms, with little research done on academic interventions for students with EBD in general education settings. Another review by Mooney, Epstein, Reid, & Nelson (2003) looked at the trends of academic interventions with EBD. The authors discovered the studies provided little information about participant characteristics and the interventions generally failed to address higher-order reasoning skills such as reading comprehension strategies (Mooney et al., 2003). Continued research into academic interventions of students with EBD that address the limitations of the current evidence-base may lead to well-developed, evidence-based practices to support students with EBD in the classroom.

Rationale

The body of research into academic interventions for students with EBD is continuing to grow. Focus is shifting from attempting to first gain control over behavior concerns before addressing academic deficits, into addressing all student needs concurrently (Wehby et al., 2003). Specifically, focus is increasing on reading interventions for students with EBD (Burke et al., 2015). However, there are few studies examining advanced skills such as reading

comprehension (Wehby et al., 2003) and even fewer studies utilizing any type of behavior supports along with the academic intervention (Burke et al., 2015). This is a concern that should be addressed with future research, as behavior strategies are important when working with students with EBD. Behavior challenges, such as noncompliance, are frequently cited as a factor for nonresponse to an intervention when working with students with EBD (Al Otaiba & Fuchs, 2006). Therefore, it seems logical to integrate empirically sound behavioral supports along with academic interventions to increase student response (Burke et al., 2015).

Some studies investigating reading interventions for students with EBD have attempted to provide both academic and behavior supports and strategies, with the majority of studies combining two separate interventions, one academic and one behavior. For example, Barton-Arwood, Wehby, and Falk (2005) conducted a study examining the effect of a reading intervention, the *Horizons Fast Track* reading program, along with Peer-Assisted Learning Strategies (PALS) as a supportive social behavioral component. Results indicated moderate improvement in basic reading skills, with mixed outcomes in student behavior variables. An additional study by Wehby and colleagues (2003) also utilized a reading intervention and PALS, with very similar results in both reading improvement and social behavior outcomes.

While these previous examples used separately designed, but complementary interventions to address the needs of students with EBD, another option is to apply a single intervention with both academic and behavior components built in. One such intervention is known as self-regulated strategy development (SRSD) which combines direct instruction (academic component) with instruction in self-regulation skills (behavior component; Harris & Graham 1999). Both direct instruction and self-regulation skills enjoy a rich literature base supporting their effectiveness for students with EBD (Landrum et al., 2003; Mooney, Ryan,

Uhing, Reid, & Epstein, 2005; Ryan, Pierce, & Mooney; 2008). Direct instruction, which includes explicit teaching of concepts, corrective feedback, and opportunities to practice new skills, meets the typical needs of students with EBD (Landrum et al., 2003). Furthermore, the parts of self-regulation skills, which include self-reinforcement, self-monitoring, self-instructions, and goal setting, can be used to address many of the behavioral needs faced by students with EBD (Lloyd, Forness & Kavale, 1998; Menzies & Lane, 2011; Mooney et al., 2005). There have been some studies conducted using SRSD to address reading deficits in students with EBD using a variety of different SRSD reading strategies (e.g. Rogevich & Perin 2008; Sanders, Ennis, & Losinski, in review). However, it remains an under-researched strategy that should be investigated in the future.

Purpose

The purpose of this study is to extend the existing SRSD reading comprehension research base by investigating its effectiveness when taught to fourth, fifth, and sixth grade students with and at-risk for EBD in a resource setting. In this study, two versions of a SRSD reading comprehension strategy will be compared to determine the impact each has on student reading comprehension. The following research questions will be investigated:

1. Does the implementation of the SRSD reading comprehension strategy TWA increase scores on the reading comprehension probes of fourth, fifth, and sixth grade students with or at-risk for EBD?
2. Does the implementation of the SRSD reading comprehension strategy TWA increase student achievement of fourth, fifth, and sixth grade students on benchmark reading tests?

3. Does the implementation of the SRSD reading comprehension strategy TWA increase MAZE scores of fourth, fifth, and sixth grade students with or at-risk for EBD?
4. Do the reading comprehension strategies taught through TWA transfer from expository text to narrative text?

Chapter 2 - Review of Literature

The purpose of this chapter is to provide a review of existing literature regarding SRSD, particularly SRSD strategies developed to address reading comprehension. First, an overview of SRSD will be provided. Next, a specific SRSD reading strategy, TWA (Think before, think While, and think After reading) will be explained in detail. Finally, a systematic review of the literature regarding SRSD reading interventions will be provided.

Self-Regulated Strategy Development

SRSD is an instructional approach developed in 1982 by Graham and Harris that combines the direct instruction of an academic strategy with self-regulation skills (Harris, Graham, Mason, & Friedlander, 2008). Graham and Harris designed the six stage approach to teaching academic and self-regulation skills as an “intervention that directly addressed [students’] affective, behavioral, cognitive characteristics, strengths, and needs” (1999, p 2). Through the SRSD approach, students receive explicit strategy instruction, as well as support in developing self-regulation skills. Self-regulation skills allow students to independently think about a task before beginning and then self-monitor their progress, ultimately completing the task. It is a skill highly valued by teachers, but not always fully developed in all students (Harris, Reid & Graham, 2004). Students with EBD often lack both the academic skills and the ability to self-regulate their behaviors (Harris & Graham, 1999). As a result, in addition to poor academic performance, these students struggle with solving problems, choosing appropriate strategies, and executing strategies. SRSD is designed to improve academic task performance and to develop self-regulation skills (Harris & Graham, 1999).

Graham and Harris cite four sources that strongly influenced their development of SRSD (Harris and Graham, 1999). The first is the works of Donald Meichenbaum, a cognitive-

behavioral researcher who wrote the book *Cognitive-Behavior Modification: Instruction*. In his book, Meichenbaum (1977) emphasizes change from negative self-talk to positive self-talk, a process that would then reflect in the person's behaviors. The second influence includes research on the social origins of self-control and development of the mind conducted by researchers such as Vygotsky. Vygotsky's social development theory, which posits that students should be active participants in their learning and collaborate with the teacher to build knowledge, can be seen within the structure of SRSD (Vygotsky, 1978). Research by Deshler and Schumaker on teaching strategy steps to students with disabilities was the third significant influence in the development of SRSD. Deshler and Schumaker (1993) provided a set of key instructional features that when applied, helped students with learning disabilities acquire strategy steps, guiding the development of the SRSD strategy steps. Finally, the final major influence on SRSD development was Brown and Campion's work on meta-cognition which can be seen in SRSD's emphasis on prior knowledge and self-reflection (Harris & Graham, 1999).

SRSD is not a singular strategy but rather a set of six stages that include: (a) developing and activating background knowledge, (b) discussing the strategy, (c) modeling the strategy, (d) memorizing the strategy, (e) supporting students using the strategy, and (f) promoting independent performance. Stages are not required to be taught independently of each other; in fact, many SRSD strategies address multiple stages within the same lesson (Harris et al., 2008; Mason, Reid, & Hagaman, 2012). Teachers are encouraged to individualize lessons based on student needs by reordering, combining and repeating the stages (Harris et al., 2008). The six stages are described in detail in Harris, Graham, Mason and Friedlander's book, *Powerful Writing Strategies for All Students* (2008). These six stages are described in detail below:

Stage 1: Develop Background Knowledge

During this stage, teachers need to identify skills necessary for the chosen strategy. For example, background knowledge that would be needed for a reading comprehension strategy might include the definition of main idea and supporting details. This information could be gathered formally through a task analysis, or informally through teacher observation. It is imperative for students to possess the necessary background knowledge to understand the selected SRSD strategy. During this stage, components of self-regulation (self-instruction, goal setting, self-monitoring, self-reinforcement) are typically introduced and discussed to establish background knowledge of these particular skills (Harris et al., 2008).

Stage 2: Discuss It

The focus of this stage is to establish the significance of the selected strategy and to outline the expected benefits from mastering the strategy. It is crucial for students to understand why the strategy is being taught and for the teacher to obtain student buy-in and commitment. If students do not understand the importance of the strategy or view it as a valuable skill to learn, it is unlikely they will use the strategy independently. The teacher may choose to lead a brainstorm session of how and when this strategy could be useful both in school and in the real world in order to gain student approval. Often, students may be asked to make a commitment to learning and using the strategy by filling out a commitment sheet that can be reviewed throughout the SRSD process. Additionally, during this stage, the teacher will provide an outline of the strategy and introduce any mnemonic device that will be utilized (Harris et al., 2008).

Stage 3: Model It

This stage of the strategy consists of the teacher modeling the strategy, explaining aloud each step of the strategy and how it should be completed. Furthermore, the teacher should also

model self-regulation skills used with the strategy. This can be accomplished by “thinking-aloud” or verbalizing the thought process while conducting the strategy. Some self-instructions the teacher might consider verbalizing include: (a) identifying the problem (“I’m getting ready to read a passage, I should use the TWA strategy to help me), (b) focusing attention and planning (“Let’s see the first thing I need to do is...”), (c) specifying strategy step statements (“I should move on to the next step now.”), (d) self-evaluating (“Opps! I missed a step – I’ll go back.”) (e) coping and self-control (“I know this is hard, but I can follow the strategy and do this.”) and (f) self-reinforcing (“I completed all the steps – I knew I could do it!”). It is crucial for the teacher to model examples of each of these self-instructions to assist students in developing their own self-regulation skills. Following the modeling done by the teacher, students should collaborate with the teacher to create examples of self-instructions students can utilize when using the strategy (Harris et al., 2008).

Stage 4: Memorize It

This stage requires students to memorize the steps to the strategy and is typically infused throughout the majority of strategy lessons (Harris et al., 2008). It is a key stage and necessary if the student is to use the strategy independently. If a strategy includes a mnemonic device, its meaning should be memorized as well. Memorization should extend beyond reciting the steps; students should be able to describe in detail each step of the strategy. This is often measured through either a written or oral quiz.

Stage 5: Support It

During this stage, the teacher scaffolds the strategy use. Students use the strategy, self-instructions, and other self-regulation skills with teachers providing as much support as needed. Lessons might suggest students work collaboratively with the teacher or peers to continue to

practice the strategy. In this stage, which is often considered the most critical, it is important to continue to provide support as long as students require. If supports are faded too quickly and the student has not mastered the strategy, it is very unlikely they will use the strategy independently or will benefit from the strategy. This stage often stretches across multiple lessons and is usually the most repeated stage (Harris et al., 2008).

Stage 6: Independent Performance

The final stage of SRSD requires the student to use the strategy independently without any assistance. During this stage, students typically fade verbal self-instruction statements and transition to thinking those statements in their head. Other self-regulation skills may be faded as well such as using the checklist. Teachers and students should create a maintenance plan to ensure students continue to use the strategy. Examples of maintenance plans may include identifying situations the strategy could be utilized (e.g. during social studies when reading out of the textbook, when taking reading tests) and identifying when booster sessions may be needed for additional practice (Harris et al., 2008).

Self-Regulation

Within the six stages of the SRSD method, self-regulation skills are taught. Self-regulation refers to the ability to think about a task, develop and implement a plan to complete the task, and then the capability to reflect on the results, planning additional action if needed (Zimmerman, Boekarts, Pintrich, & Zeidner, 2000). These skills can be very useful for students in schools as the attainment of self-regulation skills, particularly in elementary students, can be a predictor of academic achievement (McClelland, Acock, & Morrison, 2006). Students with EBD frequently display significant deficits in self-regulation skills and this deficiency can negatively affect academic performance (Wehmeyer & Fields, 2007). To gain self-regulation skills, students

with EBD may require explicit instruction (Menzies & Lane, 2011). Teaching students with EBD self-regulation skills can improve their attention to task and the ability to problem solve, which may lead to improvement in academic performance (Ryan et al., 2008; Menzies & Lane, 2011). The use of self-regulation skills can also positively influence peer and teacher relationships for students with EBD (Miller, Gouley, Seifer, Dickstein, & Shields, 2004)

As noted throughout the six stages of SRSD, self-regulation skills are infused in the strategy lessons. It is important to remember that while SRSD strategies incorporate the teaching of self-regulation skills, it does not create or teach new behaviors. It does increase the frequency in which a student displays certain behaviors (Mason et al., 2012). There are four major practices used to increase self-regulation skills: self-monitoring, goal setting, self-instructions, and self-reinforcement (Graham, Harris, & Reid, 1992).

Self-Monitoring. Self-monitoring is a skill used to provide feedback on individual behaviors. It involves two steps: (1) self-assessing the completion of a target behavior and (2) physically recording the completion or non-completion of the target behavior (Nelson & Hayes, 1981). Self-monitoring may be particularly helpful for students who struggle to attend to or complete tasks by reminding them to focus on the current activity (Menzies & Lane, 2011). There are two ways students could use self-monitoring in the classroom: (a) to monitor attention or (b) to monitor performance (Rafferty & Raimondi, 2009). The major difference between the two types of self-monitoring is when students monitor performance, they must complete an action or task, not just pay attention. Therefore, it is not surprising that there is some evidence to support the assertion that self-monitoring produces a greater effect on student behavior (Rafferty & Raimondi, 2009). Perhaps most importantly, self-monitoring is an empirically-validated

strategy for students with EBD and has been shown to improve attention and behavior (Lloyd et al., 1998).

Within the SRSD framework, students typically monitor their performance. Lessons often teach students to self-monitor the completion of the strategy through the utilization of a checklist, checking off each step as it is completed. This confirms students are completing each step of the strategy, rather than just paying attention to the lesson. Students are also prompted to self-monitor their overall performance on tasks, such as self-monitoring their writing performance.

Goal Setting. Goal setting can be an effective tool for students looking to improve academic or behavioral performance (Schunk, 2001). Goal setting can encourage students to increase necessary behaviors, develop and use strategies, increase the amount of effort put forth, and persevere until the task is completed (Menzies & Lane, 2011). Overall, goal setting can increase academic efficiency and student motivation, making it a valuable skill for students with EBD (Zimmerman & Risemberg, 1997). Since many students with EBD are unfamiliar with goal setting, they may initially require teacher guidance on how to develop an appropriate goal that is specific, obtainable, and moderately difficult (Schunk, 2001).

Within SRSD lessons, it is emphasized that goals must be valued in order to be effective (Harris et al., 2008). Teachers and students are encouraged to look at previous work to identify areas for improvement. Students are taught how to identify an area for improvement and then to monitor their progress. Frequently SRSD lessons suggest students graph their progress throughout the lessons to show individual progress as the strategy is learned.

Self-Instructions. Self-instructions are self-statements that direct behaviors or cognition and assist a student in completing a task or activity (Menzies & Lane, 2011). For many, self-

instructions are akin to the voice in your head, helping you decide what to do next. However, for some students, especially those with EBD, this voice is silent, making self-regulation more difficult. As with other self-regulation skills, students with EBD may require explicit teaching in how to construct self-instruction statements (Mason et al., 2012). These statements can be used by students as mental prompts on how to complete an activity and to provide encouragement and validation (Lange, Richard, Gest, de Vries & Loader, 1998). Previous studies that provided students with EBD self-instruction training showed increased academic performance across a variety of content areas (Swanson & Scarpati, 1984; Fish & Mendola, 1986).

Within the SRSD framework teaching students how to use self-instructions is broken down into four steps (Mason et al., 2012). First, the teacher should lead a discussion centered on why self-instructions are important. Next, the teacher and students collaboratively develop a list of self-instructions to use when working on the strategy. The teacher should then model these self-instructions aloud so students can see how and when the statements should be used. Finally, the teacher should establish activities and tasks where students can practice these self-statements.

Self-Reinforcement. Self-reinforcement occurs when a student chooses a reinforcer and self-awards once a pre-specified criterion is reached (Graham et al., 1992). After the teacher sets the criterion for the student to reach, the student selects the reinforcer with teacher approval. Once the student reaches or exceeds the pre-set criterion, the student can self-award. Examples of reinforcers can could include both intrinsic (e.g. positive self-statements, feeling proud a task is completed) and extrinsic motivators (e.g. computer time, sitting with a friend, or listening to music). Reinforcers, such as those used in token economies have been used with students with EBD in the past (Yell, Meadows, Drasgow, & Shriner, 2009).

Within the SRSD framework, students are taught to make positive self-statements after meeting a pre-set criterion. For example, a student who used all nine steps in the reading strategy might say “I did a great job using all of the steps!” These positive self-statements are designed to increase motivation and create a positive learning environment (Harris et al., 2008). SRSD uses self-reinforcement daily, often multiple times during the lesson. While the lesson does not explicitly use any type of physical reinforcers (e.g. candy, listening to music) it would be easy for teachers to include for students requiring extrinsic and intrinsic motivators. Teaching students how to self-reinforce their behavior, along with the other self-regulation strategies discussed here can provide behavioral support in conjunction with the academic strategy.

Think Before, Think While, Think After Reading (TWA).

One example of an SRSD reading comprehension strategy used to instruct struggling readers in the content area is Think before, think While, and think After reading (TWA). TWA is a multi-component SRSD reading strategy intervention, teaching students to access prior knowledge, assess text structure, monitor comprehension, summarize information and provides vocabulary instruction (Mason et al., 2012). This nine-step strategy, broken into three parts, is designed to explicitly teach students reading strategies while also demonstrating how to utilize goal setting, self-reinforcement, self-monitoring, and self-instruction skills. The explicit instruction over reading strategies combined with lessons in self-regulation skills, TWA is designed to increase students’ reading comprehension scores. TWA can be taught with whole classes, small groups, or individual students (Mason et al., 2012).

TWA Steps. The TWA mnemonic is designed to guide students through each step of the reading process, teaching students to self-regulate their learning.

The “T” in TWA stands for “Think before reading” and includes three components. The first component is to “think about the author’s purpose.” Students are taught that they can learn a lot about the passage before even reading by examining the title and the first sentence. Based on this information, students are prompted to identify the author’s purpose for writing the passage. The second two components, “think about what you know” and “think about what you want to know” are based on Ogle’s (1989) K-W-L strategy. Students are taught activating their prior knowledge about the topic helps when making inferences while reading and increases understanding of the text (Mason & Hedin, 2011).

The “W” in TWA stands for “think While reading” which teaches students strategies to utilize as they read the passage. First, students are taught to monitor their reading speed to make sure they are not reading too fast or too slow. The second component is to reread parts students don’t understand and the third component is to link what students know. This third step is especially important as many content area texts require students to utilize background knowledge to make inferences about the current text (Martins, 2002). However, for many students who struggle with reading, this step does not come naturally, as their focus remains on the literal interpretation of the text (Mason and Hedin, 2011). The inclusion of this step while reading helps students self-regulate their ability to link their previous knowledge (brainstormed in the “Think before reading” step) to the current text.

Finally, the “A” in TWA stands for “think After reading.” The final three steps of the strategy focuses on main idea development and summarization of the text. To begin, students think about the main idea of the paragraph. Using yellow highlighters, students identify the main idea(s) in each paragraph. Explicit teaching of paragraph structure shows students that the main idea is typically found in the first and sometimes the last sentence of the paragraph. Then

students move to the next step, think about the details. Students are taught that important summary details are usually found in the sentences following the main idea; these sentences are highlighted in blue. Finally, students are encouraged to complete the final step, think about what you learned. During this final step, students orally summarize the passage, using the highlighted portions as a guide.

TWA Lessons.

Mason and colleagues (2012) have developed six lessons to teach the TWA strategy, with the six stages of SRSD interwoven throughout. The lessons, which each take approximately 50 minutes to teach, introduce the strategy and provide appropriate scaffolding as students learn the strategy, gradually removing support as students become more and more autonomous. Mason and colleagues also emphasize the importance of teaching each lesson to mastery and recommend teachers allow plenty of time for students to practice and learn the strategy. Teachers are encouraged to repeat lessons until all students achieve mastery (Mason et al., 2012).

TWA. There are six lessons designed to teach the TWA reading comprehension strategy to students. The following materials are used in the TWA lessons: TWA mnemonic chart, TWA learning contract, vocabulary journal, TWA self-monitoring checklist, TWA self-instructions sheet, and 5 reading passages. These materials can be found in Appendices B and C. Students are also provided scratch paper and blue, yellow, and pink highlighters.

Lesson 1. The purpose of the first lesson is to introduce the TWA strategy and demonstrate to students how it can help them with reading comprehension. The teacher begins by showing students the mnemonic chart and describing all nine steps in detail (See Appendix B for an example). A continuing analogy about a plane trip and pilot is used throughout the explanation to convey the purpose of each step. Following the description of the TWA steps,

students are introduced to vocabulary journals. Students are told this is where they will write down vocabulary words prior to reading a passage. Next, students are asked to make a commitment to learn and use the TWA strategy. This component teaches students to set goals in their learning. Finally, the lesson wraps up with memorization practice. The success of the TWA strategy centers around students being able to use the strategy independently and to do so, students must memorize the mnemonic device.

Lesson 2. The second lesson of the TWA strategy has three goals: teach students to develop background knowledge, model the strategy, and assist students in developing self-instructions. The lesson begins with a review of the TWA steps and moves into vocabulary instruction, as students record and discuss four vocabulary words that will be found in the text. Next, the teacher models the TWA strategy with a sample passage, emphasizing goal setting, self-monitoring, and self-statements. This lesson is particularly important because the teacher not only models the strategy, checking off each step as it is completed, but also verbalizes the thinking process while reading the passage. For example, the teacher may start out by saying “Hmm what is the first thing I need to do? I need to think about the author’s purpose. I know I can find that in the title and first sentence, so I’ll read that first.” Verbalizing the thinking process teaches students what they should be thinking about as they read. Following the modeling, students are given a self-instruction sheet to write down statements students can say to themselves while using TWA. This part of the lesson explicitly teaches students how to use self-instructions while reading. The lesson wraps up with a review of what TWA stands for, as well as reviewing learning contracts (emphasizing goal setting) and vocabulary words.

Lesson 3. During lesson three, the teacher begins increasing student involvement with the strategy while still providing the scaffolding as students develop their skills. The lesson begins

with a review of the strategy and the introduction of vocabulary words. When it comes time to read the practice passage, students are encouraged to collaboratively complete the steps as a group. Each student is given a checklist, teaching them to self-monitor their learning. After collaboratively moving through each of the nine steps, students are prompted to look at their self-instruction sheets and add any statements that could be helpful. The lesson ends with a review of TWA, learning contracts, and vocabulary words.

Lesson 4. This lesson pairs students to collaboratively practice the TWA strategy, as teacher supports are gradually removed to promote student independence while still providing supports as necessary. After practicing the steps of TWA, the vocabulary words are introduced and entered into journals. Next, students are prompted to complete the “Think before reading” and “While reading” steps with their partners. Checklists are provided to encourage students to self-monitor their learning. As students work, the teacher monitors the pairs providing support and reinforcement as needed. Following the completion of these steps, students are prompted to find the main idea and summary details using highlighters and to provide an oral retell of the passage. Similar to previous lessons, students end by reviewing the TWA steps, self-instruction sheets, learning contracts, and vocabulary words.

Lesson 5. This lesson begins with an oral quiz over the nine steps of TWA to determine how well students know the steps. Students are taught new vocabulary words which they record in their journals. Students will again work in pairs to read a passage using the TWA strategy. However, in this lesson, supports are slowly removed to show students this strategy can be used even without a TWA checklist and highlighters. Students are taught to create their own checklist to self-monitor their learning. They are also taught to identify main ideas and details by writing “MI” and “D” next to the sentences. The purpose of this change is to emphasize to students they

can use this strategy in any class or situation, without any special materials. Again, the lesson ends with students reviewing the steps to TWA, looking at self-instruction sheets, vocabulary journals, and learning contracts.

Lesson 6. The final lesson is similar to the previous lesson. It begins with a review of TWA steps and new vocabulary words. Students work in pairs to read a passage with the TWA strategy, practicing the steps without the supports (checklist and highlighters). Students wrap up with a review of the steps, review of self-instruction sheets, vocabulary words, and learning contracts. This lesson should be repeated as many times as necessary with increasingly longer and more complex passages until students are able to complete the steps independently.

TWA is one SRSD strategy available to utilize as a reading comprehension intervention. The inclusion of direct instruction and self-regulation skills aligns with existing, evidence-based practices for students with emotional and behavioral disabilities. The strategy has potential to support students with EBD struggling with reading comprehension, an academic deficit many students with EBD face (Burke et al., 2015).

Previous Reviews

Interventions to increase reading comprehension of students enjoy a rich literature base. There are many proposed reading interventions for students and numerous meta-analyses have been conducted to examine reading comprehension interventions. Some of the reviews focus on reading comprehension interventions for students with learning disabilities. For example, Talbott, Lloyd, and Tankersley (1994) and Mastropieri, Scruggs, Bakken, and Whedon (1996) reviewed current reading comprehension interventions. A more recent meta-analysis by Berkeley, Scruggs, and Mastropieri (2010) reviewed 40 studies and found, much like previous reviews, that reading comprehension interventions are very effective. Of the studies reviewed, 11

utilized self-regulations, including some that specifically used SRSD as the independent variable. Studies using self-regulation had higher overall weighted effect sizes, and the differences between studies including self-regulation and those that did not approached statistical significance (Berkeley et al., 2010).

More recently, increased focus on developing academic strategies for students with EBD has led to reviews specifically targeting this group of students. A review by Benner and colleagues (2010) found students with EBD were responsive to reading interventions. Burke and colleagues (2015) conducted a quantitative review of reading interventions for middle and secondary students with EBD. This review examined 11 single case design studies finding overall positive effects as a result of the interventions, supporting the assertion that students with EBD benefit from intense academic interventions (Burke et al., 2015; Ennis & Jolivet, 2014; Maggin et al., 2016). These reviews establish the effectiveness of reading comprehension interventions for multiple disabilities, but do not specifically address SRSD.

There are reviews supporting the SRSD strategy in writing. Gillespie and Graham (2014) conducted a meta-analysis of 43 studies of writing interventions for students with learning disabilities, including 15 studies that examined the effects of strategy instruction, of which seven used SRSD. Not only did the effect sizes of strategy instruction indicate statistically significant improvement in writing, but the effect size of SRSD studies compared to other strategy instruction studies was significantly greater (Gillespie & Graham, 2014). Two recent reviews by Ennis and Jolivet (2014), and Sreckovic, Common, Knowles, and Lane (2014) determined SRSD writing interventions are considered an evidence-based practice. Finally, the meta-analysis by Losinski, Cuenca-Carlino, Zablocki, and Teagarden (2014) produced additional evidence that SRSD writing interventions are effective in teaching students at-risk and with EBD.

Although there are reviews and meta-analyses that show both reading comprehension interventions and the use of SRSD in writing are effective when working with students with disabilities, there has been little examination of the effects of SRSD reading comprehension interventions. A review by Mason (2013) did examine SRSD and reading comprehension, specifically the intervention TWA (Think before, think While, and think After). Growth in expository reading comprehension (assessed through both formal and informal reading comprehension tests) indicated SRSD was effective at improving reading comprehension of students both with and without disabilities.

However, limitations exist to the review conducted by Mason (2013) as noted in the article. First, the studies included in the review came from one program of research, with only one independent replication included. This review also limited itself to only studies using TWA, excluding other potential SRSD reading comprehension interventions. Also, the review did not aggregate data for disability, disability type, or any other student characteristics. Specific effects on students with disabilities or other particular student characteristics have not been examined. Finally, the Council for Exceptional Children (CEC; 2014) standards for evidence-based practices should be applied to studies in order to measure the quality of the studies and evaluate the evidence base of the SRSD strategy on reading comprehension.

SRSD Literature Review

Therefore, the purpose of this systematic review of the literature is to examine findings on reading comprehension and the SRSD strategy through the analysis of all published studies and dissertations regarding SRSD for reading and students with disabilities. The following review is constructed around the following research questions:

Research question 1: What are the relative effects of studies utilizing SRSD as a way to improve reading comprehension among students with disabilities?

Research question 2: What types of SRSD reading comprehension strategies are utilized to teach reading comprehension and were there differences in effectiveness?

Research question 3: What are the relative effects SRSD reading comprehension strategies had on the reading comprehension of students with EBD?

Research question 4: Are SRSD reading strategies an evidence-based practice for reading comprehension using the CEC (2014) standards for evidence-based practices?

To answer these research questions, a systematic review of existing literature was conducted. A database search of Education Full Text, Academic Search Premier, ERIC, and PsychINFO was conducted on January 29, 2017 using the Boolean phrase: (“read*” OR “comprehension”) AND (“self-regulat*” OR “SRSD” OR "strategy instruction" OR “mnemonic” OR “self-regulated strategy development”) AND (“child” OR “adolescent” OR “student”). To ensure recent articles were not missed, hand searches were conducted in the following journals for years 2013-2017: *Journal of Learning Disabilities*, *Journal of Special Education*, *Remedial and Special Education*, and *Exceptional Children*. These journals were chosen for hand searches because they frequently publish research over academic interventions for students with disabilities including those with EBD. Additionally, ancestral searches of previous literature reviews and syntheses were completed to identify any studies meeting inclusion criteria that were not previously identified.

To be included in the review, studies had to meet specific criteria. Specifically, included studies had to present results from a quantitative study. Participants in the study had to be (a) between the ages of five and 18, (b) have a disability, and (c) be receiving special education

services under IDEA. The intervention had to take place at a school, include an SRSD reading strategy as the independent variable, and at least one of the dependent variables had to be a measure of reading comprehension (e.g. oral retell, written retell, MAZE, and reading comprehension questions).

Coding Procedures:

The articles included in the synthesis were then coded based on the following seven variables: (a) participants, (b) setting, (c) disability, (d) intervention agent, (e) independent variable, (f) dependent variable, and (g) methodology.

Participants and Setting. Information collected on participant characteristics included the number of participants in the study, and the average age, race, and gender. Additionally, detailed data about student disability was coded. In many cases, students exhibited co-morbid diagnoses. If this was applicable, all identified diagnoses were listed. The setting referred to the location where the intervention took place. While all studies in this review took place at a school setting during the school day, there was a wide continuum of placements. These placements included the general education classroom, resource rooms, self-contained resource rooms, special-day schools, and schools within residential treatment facilities.

Design Features. Information about the study design was also collected and coded. First, the intervention agent was identified and coded as the researcher, clinician, graduate student, or teacher. In cases where the intervention agent was identified as having multiple roles (e.g. researcher and teacher), both roles were noted. Additionally, information concerning the independent and dependent variables was recorded. To be included in the study, the independent variable had to be an SRSD reading comprehension strategy. The description of the strategy steps was examined for the six instructional steps identified by Graham and Harris (1999) to

determine if a reading comprehension strategy qualified as SRSD. The dependent variable(s) in this study was reading comprehension. Dependent variables were coded as oral retell, written retell, MAZE, and/or comprehension questions. If multiple dependent variables were included in the study, they were all noted on the characteristics table, however only one dependent variable was analyzed when finding the effect size. If multiple dependent variables were identified and reported, the oral retell was used for data analysis. Finally, the methodology of the study was noted. Studies using randomized control trials, quasi-experiments, regression discontinuity, and single-case design were included in this review.

Outcome Measures. In order to examine the significance of the reported results effect sizes were calculated. An effect size “quantifies the degree to which the sample results diverge from the expectations” (Vacha-Hasse & Thompson, 2004, p. 473). In other words, an effect size explains the magnitude of change caused by the independent variable. The included studies were a mix of seven single case design (SCD) and three group designs (quasi-experimental and randomized control trial).

While the use of effect sizes is widely accepted as a method of judging the effectiveness of a group design study (Shadish & Haddock, 2009), the use of effect sizes in SCD is a fairly recent change in the literature (Valentine, Tanner-Smith, Pustejovsky, & Lau, 2016). While effects sizes should not replace the use of visual analysis in evaluating SCD’s, the addition of effect sizes allows reviewers to examine results within the same context as group designs, specifically with the use of confidence intervals and significant tests and the ability to combine multiple SCD studies together to compare results (Shadish, Hedges, Horner, & Odom, 2015). The inclusion of both SCD and group designs is novel and would require the use of a statistic for SCD that is in the same metric used for group designs allowing for the direct comparison of

effect sizes in both subject designs (Shadish, Hedges, & Psutejovsky, 2014). One *d*-statistic that has been utilized in previous meta analyses comparing both SCD and group designs (e.g. Losinski et al., 2014) is Hedges *g*. Hedges *g* for SCD, (also called between case standard mean difference; BC-SMD) is a between-case effect size that may be used to compare SCD with Hedges *g* for group designs (Shadish et al., 2015). There are three ways to calculate between-case effect sizes: BC-SMD, Hedges *g*, and the Bayesian approach (Shadish et al., 2015). For this review, BC-SMD was calculated for all appropriate (five cases) SCD studies in this review. Results were inputted into Comparative Meta-Analysis (CMA; version 2.2064), and then compared with the Hedges's *g* statistic calculated for the group design studies.

To calculate Hedges *g* for group designs, the means and standard deviation were gathered from the dependent variables. In the case of Johnson, Graham and Harris (1997), the school where the study was conducted refused to allow a control group noting it would be unethical to withhold the intervention from students in need. The lack of a control group led to this study being excluded from statistical analysis. The study conducted by Sanders, Ennis, and Losinski (in review) utilized hierarchical linear modeling to analyze the collected data, and didn't report the means and standard deviation. To compute Hedges *g* for this study, first the variance was calculated using the following equation: $r^2 = \frac{\sigma_{null}^2 - \sigma_{random}^2}{\sigma_{null}^2}$ (Woltman, Feldstain, MacKay, & Rocchi, 2012). σ_{null}^2 is the sigma value from the null testing and σ_{random}^2 was derived from piece-wise hierarchical linear modeling growth curve analysis. Once r^2 was determined, *r* was calculated by finding the square root of r^2 and used along with the number of participants to calculate the Hedges *g* statistic in CMA (version 2.2.064).

Data from SCD's were obtained from each graph using Engauge Digitizer (version 10.3). The free software converts graphs into data points and creates a table that can then be exported.

Data from baseline and intervention phases were collected; if a study included a maintenance or generalization phase, this was not included. Studies were examined to ensure the reported data met these requirements of three cases and three data points within each phase (Shadish et al., 2014). Participants from Hoyt (2014) and Mason, Snyder, Sukhram, and Kedem (2006) were removed for not having three data points in both the baseline and intervention phases.

Additionally, the studies by Hedin, Mason, and Gaffney (2011) and Johnson (2011) were excluded from analysis due to reporting only two demonstrations of effect. Data from the graphs were then imputed into an open-source, web-based program called *scdhl*m to compute the BC-SMD (Pustejovsky, 2016). Data was de-trended by assigning session numbers to each case session as the de-trending variable. Computed data was then entered in CMA (version 2.2.064) and compared to the group design scores utilizing Hedges *g*. Interpretation of Hedges *g* is as follows: $g < 0.20$ is a small effect; $g > .50$ is a medium effect, and $g \geq 0.80$ is a large effect.

The use of effect sizes to analyze SCD is meant to complement traditionally used visual analysis thus a visual analysis of the graphs from SCD was conducted to determine the response rate (RR) of the intervention as described in the *Procedures and Standards Handbook (Version 3.0)* from the What Works Clearinghouse (2014). Changes in level, trend, and variability were visually examined to determine if there was a functional relation demonstrated, indicated by a change in the dependent variable with the introduction of the intervention. If there was a functional relation, the case was considered a responder to the intervention. To calculate an overall RR, the total number of responders in a study was divided by the total participants in the intervention.

Additionally, the percentage of nonoverlapping data (PND) was also calculated for these studies (Scruggs, Mastropieri, & Casto, 1987). To calculate PND, the number of treatment points

above the highest baseline data point was divided by the total number of treatment points (Scruggs et al., 1987). One major advantage of PND is that it provides an easy and highly reliable method for evaluating SCD studies, even when precise scores are not provided (Scruggs & Mastropieri, 2013). PND is described as a percentage and is interpreted as follows: $PND > 70\%$ indicates an effective intervention, $70\% > PND > 50\%$ is a questionable intervention, and $PND < 50\%$ is an ineffective intervention.

Publication bias. The risk of publication bias, or the likelihood only positive results were published and null results were excluded is a critical problem that must be accounted for in a review of literature (Liberati et al., 2009). Publication bias has shown to be a persistent problem in the social sciences (Cook & Odom, 2013; Maag & Losinski, 2015), particularly when reviewing single-case designs (Shadish, Zelinsky, Vevea, & Kratochwill, 2016). While there is not one agreed upon method for addressing publication bias, it is recommended a minimum of two approaches be used in analysis (Banks, Kepes, & Banks, 2012; Sackett & Larson, 1990). Within this review, multiple approaches were used to address publication bias.

First, included studies were not limited to peer-reviewed studies, but rather incorporated all publically available studies. Second, publication bias analyses were conducted using CMA (version 2.2.064). It should be noted that CMA does not allow publication bias analyses to be conducted when studies are grouped together (e.g. by study design). Therefore, SCD and group design studies were grouped together for the analyses. The analyses conducted included Rosenthal's fail safe N (Rosenthal, 1979), Egger's regression of the intercepts test (Egger, Davey Smith, Schneider, & Minder, 1997), and Duval and Tweedie's trim and fill method (Duval & Tweedie, 2000). Rosenthal's fail safe N seeks to determine if non-significant studies are missing from the analysis, and how many null effects would be needed to bring the effect size down to

nonsignificant levels. If the number of missing studies needed to nullify the effect size is small, it can be reasonably inferred publication bias may exist. Accordingly, if the number is large, there is increased confidence in the effect size. Egger's regression of the intercept test divides the effect size by the standard error. The size of the treatment effect is displayed as the regression line, while the bias is captured by the intercept. If the intercept is zero, there is likely no bias present. An intercept of more than zero would indicate the presence of publication bias. Duval and Tweedie's trim and fill method inputs the included studies into a funnel plot. It is expected the funnel plot be symmetric with the studies distributed evenly on either side of the mean effect. In the event the studies are not symmetric, it is determined where the missing studies would likely fall if included and the effect size is recalculated with the new data points.

Quality of study. The Council for Exceptional Children's (CEC) *Standards for Evidence-Based Practices in Special Education* (2014) was used to determine the quality of both SCD and BSD studies. Studies were evaluated under the eight domains outlined in the standards: (a) context and setting, (b) participants, (c) intervention agent, (d) description of practice, (e) implementation fidelity, (f) internal validity, (g) outcome measures/dependent variables, and (h) data analysis. Within the eight domains, specific indicators were used to evaluate the quality of each study. The CEC *Standards* recognize the difference between SCD and group designs, creating specific indicators unique to each type of study in order to ensure both study designs can be evaluated fairly. When rating the studies, the reviewer looked to see if each indicator was explicitly stated. If it was not explicitly stated, the reviewer used informed judgment and guidance from *CEC's Standards for Classifying the Evidence Base of Practices in Special Education* to determine if it could be reasonably inferred that the indicator was met (Cook et al.,

2015). In order to be considered a methodologically sound study, based on the CEC standards, all indicators in all eight domains must be met.

Results

The initial search yielded 641 articles. After duplicates were removed, 625 articles remained; the titles and abstracts were screened, leaving 36 articles to be coded using the previously explained criteria. Following coding, eight articles were identified for inclusion. The hand search yielded one more article, as did the ancestral search, bringing the total number of included articles in the literature synthesis to ten (See Figure 1). The majority of studies included in this review are SCD ($n = 7$) with the rest qualifying as a group design ($n = 3$). Detailed descriptions of characteristics of studies can be found in Table 1.

Figure 2.1 Article Flowchart

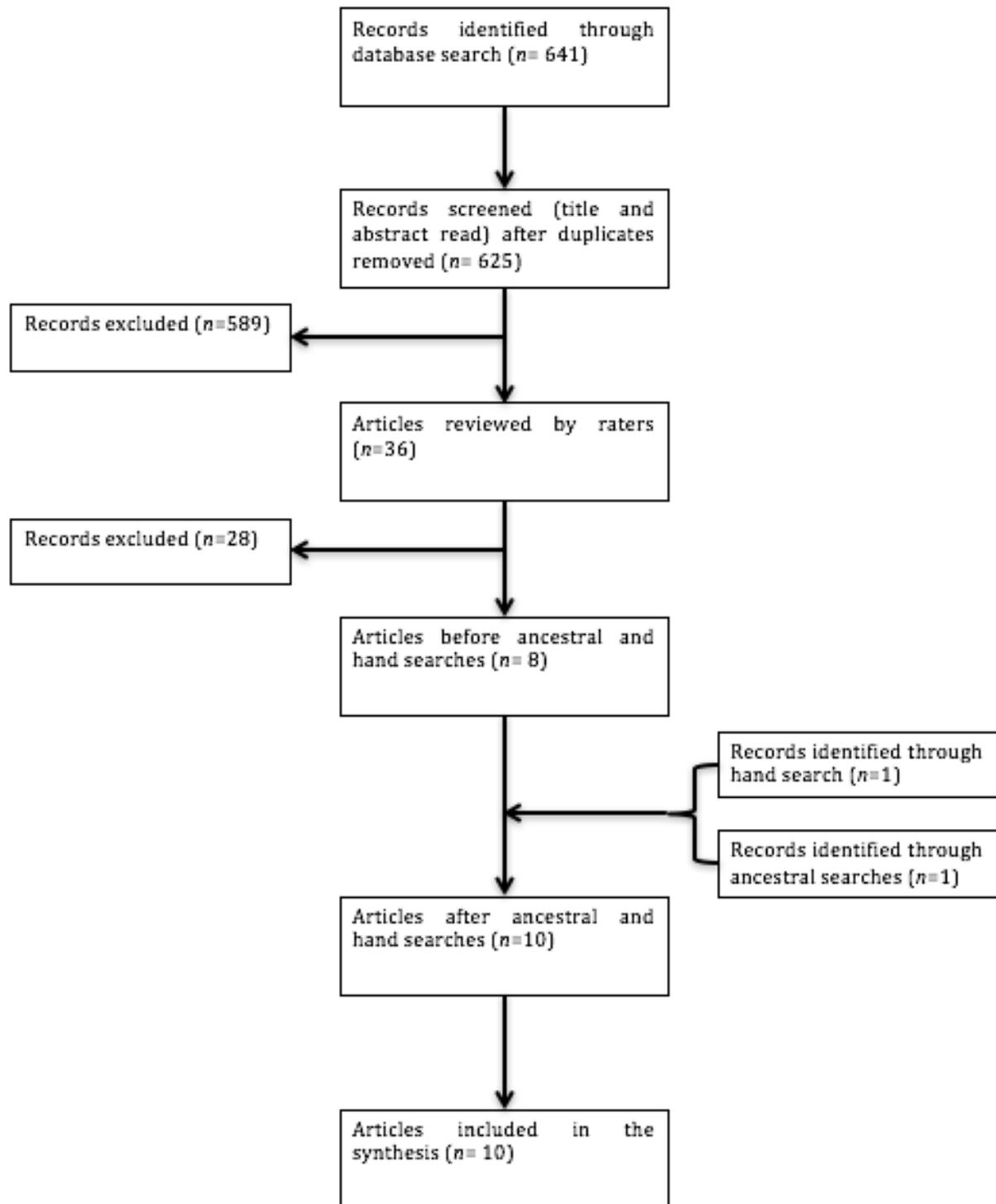


Table 2.1 Study Characteristics

Study	N	Age	Gender	Race	Disability	Setting	Intervention Agent	Dependent Variable	Independent Variable	Methodology
Ennis, 2016	3	N/A	2 F, 1 M	1 B, 2 W	ADHD, BI, CD, MD, ODD, PTSD	Residential	Researcher	Oral and Written Retell	TWA + PLANS	SCD
Hedin et al., 2011	2	10.5	2 M	N/A	ADHD, LD, SLI	Resource	Researcher	Oral Retell	TWA	SCD
Howorth et al., 2016	4	10.5	4 M	N/A	ASD	Gen. Ed/ Self-contained Special Day	Researcher	Oral Retell; Comp. Questions Written Retell	TWA	SCD
Hoyt, 2010	10	14.8	8M, 2F	4 B, 1 H, 5 W	EBD		Teacher	Questions Written Retell	TWA	SCD
Johnson, 2011	3	1.5	3F	N/A	ADHD, BI, DD	Resource	Researcher	Oral Retell	TRAPeR	SCD
Johnson et al., 2012	3	14.7	3M	3 W	ADHD, SLI, ID	Resource	Researcher	Oral Retell	TWA	SCD
Johnson, et al., 1997	47	11.3	34 M, 13 F	36 B, 11 W	LD	Resource	Grad Student	Oral Retell	SRSd	RCT
Mason et al., 2006	9	10.1	5 M, 4 F	1 B, 8 W	EBD, LD, SLI, Title I	Gen. Ed	Researcher	Oral and Written Retell	TWA + PLANS	SCD
Rogevich & Perin, 2008	63	14.8	63 M	26 B, 15 H, 22 W	BD, ADHD	Residential	Clinician	Written Retell	TWA+WS	Quasi
Sanders et al., in review	25	14.9	20 M, 5F	18 W, 3 B, 4 H	EBD, OHI, ASD	Special Day	Teacher/ Researcher	Oral Retell, MAZE	TWA	Quasi

Note. ADHD = Attention Deficit/Hyperactivity Disorder; ASD = Autism Spectrum Disorder; B = Black; BD = Behavior Disorder; BI = Bipolar Disorder; CD = Conduct Disorder; DD = Depressive Disorder; EBD = Emotional and Behavioral Disorder; F = Female; Gen. Ed = General Education Classroom; H = Hispanic; ID = Intellectual Disability; M = Male; MD = Mood Disorder; ODD = Oppositional Defiant Disorder; PTSD = Post-Traumatic Stress Disorder; Quasi = Quasi-experimental; RCT = Randomized Control Trial; SCD = Single Case Design; SLI = Speech and Language Impairment; SRSd = Self-regulated Strategy Development; TRAPeR = Think before you read, Read a paragraph, Ask yourself the main idea and support details are, Paraphrase the main ideas and details, and Review what you read; TWA = Think before, think While, think After reading; TWA + PLANS = Think before, think While, think After reading + Pick goals, list ways to meet goals, And make notes, Sequence notes; TWA + WS = Think before, think While, think After reading + Written Summary

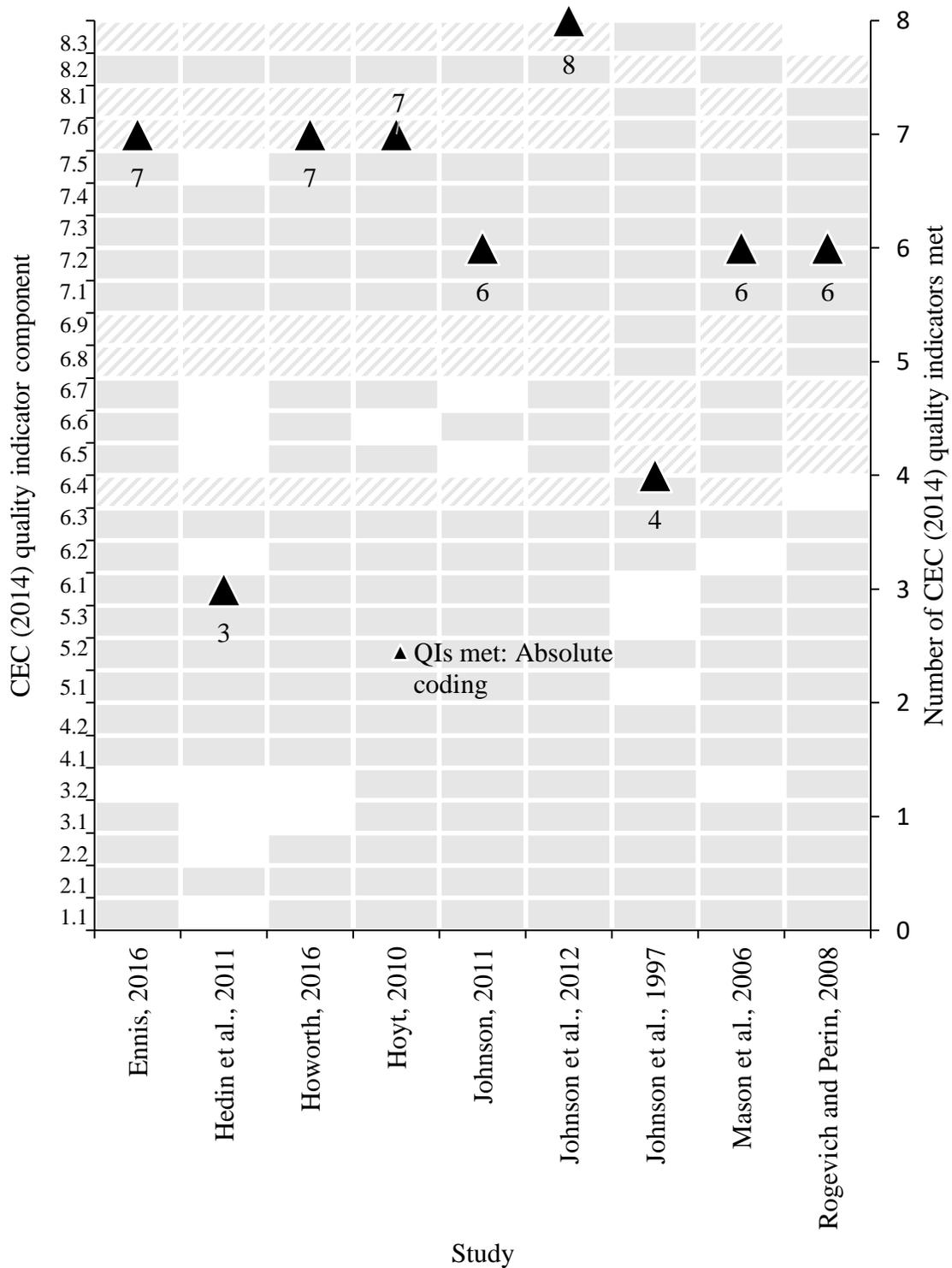
Participants. Of the ten included articles, with 11 reported studies, there were a total of 169 students. Nine out of the ten studies provided an average age of students with a range of 10.1 to 14.9 years old and a mean of 13. All ten studies provided information on gender of students with the number of males largely exceeding the number of females ($n = 140$ and $n = 29$ respectively). Seven out of ten studies provided information about the race of students, with Black being the most common ($n = 71$), followed by White ($n = 69$) and Hispanic ($n = 20$). Disabilities of students participating in the studies include attention deficit hyperactivity disorder (ADHD), autism spectrum disorder (ASD), bipolar disorder, conduct disorder, depressive disorder, EBD, intellectual disability, mood disorder, oppositional defiant disorder, post-traumatic stress disorder, and speech and language impairment.

Setting. Detailed information concerning the setting of the intervention was collected from all ten studies, with a total of 11 settings reported. The most common setting in which the intervention was delivered was a resource room ($n = 4$). The general education classroom ($n = 2$), special-day school ($n = 2$) and residential school ($n = 2$) were next in frequency. Finally, one study used a self-contained setting within an elementary school.

Design Features. The most common intervention agent in the studies was a researcher ($n = 6$), followed by teacher ($n = 2$), and then graduate student ($n = 1$) and clinician ($n = 1$). The dependent variable measured in all studies was reading comprehension and three of the ten studies collected two different dependent variables within the same study. The three ways comprehension was measured included oral retell ($n = 8$), written retell ($n = 4$), and comprehension questions ($n = 1$). The independent variable was the type of SRSD strategy utilized and consisted of TWA ($n = 5$), TWA+PLANS ($n = 2$), TWA+WS ($n = 1$) and an unspecified SRSD strategy ($n = 1$).

Quality Indicators. Quality indicators were calculated for all studies except for Sanders, Ennis, and Losinski (in review) which was omitted from analysis considering the design used was an interrupted time-series analysis and did not include a control group. Only one study, Johnson, Reid, and Mason (2012) met all eight of the CEC Quality Indicator Standards (2014). The percentages of met indicators were calculated for all studies. The average was 89% and ranged from 59% (Hedin et al., 2011) to 100% (Johnson et al., 2012). The most frequently omitted indicator ($n = 5$) was any specific training and/or qualifications required of the intervention agent (indicator 3.2). Other indicators commonly omitted included descriptions of fidelity ($n = 2$; indicators 5.1 and 5.3), description of baseline activities ($n = 2$; indicator 6.2), and in SCD studies, indicators relating to internal validity ($n = 2$; indicators 6.5, 6.6, and 6.7). Figure 2.2 provides additional details about the quality indicators met by each study.

Figure 2.2 CEC Quality Indicators



Note: Left y axis displays the components of CEC (2014) quality indicators (QI). Shaded cells indicate the component was met; white cells denote the component was not met; diagonal lines signify the component did not apply to the study. The right x axis shows the number of absolute QI.

Effects of Studies. Table 2.2 displays the results of the effects for Hedges g for both SCD and group designs. As previously noted, two studies Johnson (2011), and Hedin, Mason, and Gaffney (2011) were excluded from calculations due to a lack of data points for analysis. The omnibus effect size was large ($g = 2.209$ [0.327], $p = 0.000$) with all studies demonstrating large effects based on the interpretation recommendations provided by Cohen (1988). The effect size of the combined group design studies ($g = 2.424$, [0.522], $p = 0.000$) was larger than the combined SCD studies ($g = 2.069$, [0.419], $p = 0.000$). Effect sizes ranged from a high of 3.774 ($se = 0.828$; Rogevich and Perin A) and a low of 1.082 ($se = 0.506$; Sanders et al., in review).

Table 2.2 Effect Sizes

Design	Study	g	SE	var	Lower Limit	Upper Limit	Z	p	Std. diff in means and 95% CI
SCD	Ennis (2016)	3.044	0.858	0.736	1.362	4.726	3.548	0.000	
SCD	Horworth et al., (2016)	1.889	0.402	0.162	1.101	2.677	4.699	0.000	
SCD	Hoyt (2010)	1.437	0.237	0.056	0.972	1.902	6.063	0.000	
SCD	Johnson et al., (2012)	2.917	0.625	0.551	1.463	4.371	3.931	0.000	
SCD	Mason et al., (2006)	1.821	0.742	0.551	0.367	3.275	2.454	0.014	
SCD		2.069	0.419	0.176	1.248	2.891	4.935	0.000	
RCT	Rogevich & Perin A (2008)	3.774	0.585	0.342	2.628	4.920	6.455	0.000	
RCT	Rogevich & Perin B (2008)	2.543	0.467	0.227	1.610	3.477	5.340	0.000	
RCT	Sanders et al., (in review)	1.082	0.506	0.256	0.089	2.074	2.136	0.033	
RCT		2.424	0.522	0.272	1.402	3.447	4.646	0.000	
Total		2.209	0.327	0.107	1.568	2.849	6.757	0.000	

Note: g = Hedges g SE =Standard Error; var = variance; Z = Z-score; p = p-score; CI = confidence interval

Table 2.3 presents the results of the response rate (via visual analysis), percent of non-overlapping data (PND; Scruggs et al., 1987) and Hedges’ g (Shadish et al., 2014) for SCD studies. Visual analysis of graphs resulted in a response rate of 96%. The overall PND was 84.84%, which is interpreted as an effective intervention based on the guidelines provided by Scruggs and Mastropieri (1988). The range of PND included a high of 100% (Ennis, 2016; Hedin et al., 2011; Johnson, 2011) and a low of 71% (Hoyt, 2010) indicating an effective outcome for all SCD studies included in the analysis.

Table 2.3 SCD Effect Sizes

Study	RR/ <i>n</i>	PND% (SD)	<i>g</i> (var.)	95% CI
Ennis (2016)	3/3	100	3.044(0.736)	1.619 - 4.838
Hedin et al., (2011)	2/2	100	-	-
Howorth et al., (2016)	4/4	75	1.889(0.162)	1.142 – 2.701
Hoyt (2010)	7/8	71	1.437(0.056)	1.005 – 1.922
Johnson (2011)	2/2	100	-	-
Johnson et al., (2012)	3/3	95	2.917(0.551)	1.828 – 4.215
Mason et al., (2006)	3/3	89	1.821(0.551)	0.650 – 3.357
Total	24/25	84.84(20.2)	2.069(0.176)	1.248 – 2.891

Note: CI = confidence interval; *g* = Hedges' *g*; *n* = number of participants; PND = percent of nonoverlapping data; RR = Response Rate; SD = standard deviation; var. = variance

Additional analysis. Hedges' *g* was calculated grouping studies by independent variable. Studies using TWA were compared to studies utilizing TWA and a writing component (either PLANS or WS). Studies with a writing component had an effect size of 2.824 (*se* = 0.377; *p* = 0.00) and studies conducted without a writing strategy had an effect size of 1.67(*se* = 0.297; *p* = 0.00). Separate meta-regressions could not be run to determine if a writing component significantly predicted increased effect sizes due to the small number of studies included.

Hedges' *g* was also calculated for studies whose participants were students with EBD. There were four studies (five outcomes) that sought to examine the effects of SRSD reading comprehension strategies on students with EBD. The omnibus effect size was 1.849 (*se* = 0.181). Again though, the paucity of studies conducted over SRSD reading comprehension, particularly those including students with EBD, prevented further analyses to predict accurate and reliable effect sizes.

Publication Bias. The Hedges' *g* metric was utilized to conduct publication bias analyses. Results of the analyses are presented in Table 2.4. Rosenthal's Fail-Safe *n* suggest it would require a total of 305 studies for the *p* value to exceed 0.050 indicating a limited potential to bias. However, the results of Egger's regression of the intercept test (intercept = 2.611;

$p < 0.042$) suggest bias may exist. The results of the Trim and Fill method support the indication that potential bias may exist with a total of three trimmed studies and an adjusted g of 1.642 (observed $g = 1.902$).

Table 2.4 Publication Bias

Fail-Safe N	Z	p	Z for α	No. of Observed Ss	No. of S Needed to Bring p to $> \alpha$
	12.24	0.000	0.050	8.0	305.0
Egger's Regression Intercept	Intercept	SE	t Value	p	95% CI
	2.611	1.266	2.062	0.042	-0.487-5.709
Trim and Fill	Studies Trimmed	Adjusted g	Observed g	Q	95% CI
	3	1.642	1.902*	43.844	1.026-2.364

Note: All values for trim and fill are the adjusted values, except those marked with an *.

Discussion

This review of literature examined the effects of studies investigating the use of SRSD as a reading comprehension intervention for children and adolescents with a disability. Overall, SRSD appears to be an effective strategy to address reading comprehension deficits of students with disabilities. Significant, positive effect sizes were found for all studies. Group design studies had slightly higher effect sizes than SCD. Additionally, studies utilizing an SRSD reading comprehension strategy coupled with an SRSD writing component demonstrated effect sizes almost one standard deviation higher than studies using only the reading comprehension component. Furthermore, only one study met all of CEC's quality indicators (2014). There exist areas of improvement concerning study design in order for SRSD to be considered an evidence-based practice for students with disabilities. A discussion of these findings will be presented as

they relate to the proposed research questions. Finally, limitations of the current review, as well as implications for practice and future research are considered.

Effects of SRSD Reading Comprehension Strategies. The review of literature suggests SRSD is an effective reading comprehension strategy for students with disabilities, including those students with EBD. This supports previous reviews that indicated SRSD academic strategies are effective for students with both learning disabilities (Gillespie & Graham, 2014; Graham & Harris, 2003) as well as for students with EBD (Ennis & Jolivet, 2014; Losinski et al., 2014; Sreckovic et al., 2014). The omnibus effect size ($g = 2.207$) is well above what is considered a large effect size ($g \geq 0.80$; Cohen, 1988). Results indicate the SRSD reading strategies used in the included studies had a significant effect on reading comprehension scores of students with disabilities. Study design did not appear to impact the effect of the intervention as effect sizes for both SCD and group design fell above the threshold for a large effect size ($g = 2.069$ and $g = 2.424$ respectively; Cohen, 1988). A larger effect size for group design's does support previous research suggesting the one-to-one format often utilized in SCDs and with students with disabilities may not be the ideal format for teaching TWA due to the student and teacher discourse provided in a group setting (Mason, 2013). Further studies utilizing both SCD and group designs should be conducted to determine if a one-to-one approach or group approach increases student success. Overall, the review supports assertions that SRSD is an effective reading comprehension strategy for students with disabilities (Mason, 2013; Mason et al., 2012).

Impact of Independent Variables and Participants. Effect sizes were also calculated by grouping studies using the TWA reading strategy with a writing component and studies that only used the TWA strategy. The three studies that combined the reading and writing components had a significantly higher effect size ($g = 2.824$) than the studies that only used the

reading component ($g = 1.667$). The higher effect size of the combined reading and writing strategy suggests student comprehension of a passage is increased when a writing component is taught in conjunction. It may be that through the addition of writing outlines and the process of writing, there is an increase in a student's comprehension and understanding of a selected passage. The use of SRSD strategies to improve writing quality for students with EBD is already documented as an evidenced-based practice (Ennis & Jolivette, 2014; Losinski et al., 2014; Sreckovic et al., 2014), but its effect on comprehension has not been examined. Therefore, additional research is needed to determine the impact of an SRSD reading strategy combined with a writing strategy on reading comprehension. Future research should compare the two strategies with students with EBD to determine the more effective intervention on reading comprehension.

Analysis of studies based on student disability suggests students with EBD may benefit from the use of SRSD reading comprehension strategies. The use of self-regulation strategies, combined with explicit strategy instruction would suggest it an effective reading intervention for students with EBD (Rogevich & Perin, 2008; Sanders et al., in review). Moreover, SRSD's established effectiveness as a writing strategy for students with EBD supports the hypothesis that the same strategy method would also benefit this group of students in reading (Ennis & Jolivette 2014; Losinski et al., 2014; Sreckovic et al., 2014). While the studies did report a g score that would indicate it highly effective (Cohen, 1988) the small number of studies does prevent further analyses that would allow this assumption to be fully tested.

SRSD and the CEC (2014) Standards for Evidence-Based Practices. The CEC standards (2014) were applied to all studies to establish quality of each study. Only one study met all of CEC's quality indicators (Johnson et al., 2012). While the overall percentage of quality

indicators met was high (89%), there were a few consistently missed indicators. Failure to describe the training of the intervention agent was most frequently missed (50%), which is particularly concerning considering the large amount of information taught with the SRSD strategy. Harris and colleagues (2008) note the strategy is complex, as teachers are providing both strategy instruction and teaching self-regulation skills. Therefore, it is important that the type of training be noted in future studies to ensure teachers fully understood the strategy and how it should be implemented. Before a teacher or a school implements SRSD, it is important to know the necessary training that should be provided in order for the method to be taught successfully (Harris et al., 2008).

It is important to note that only three of the studies included in this review were conducted following the release of the CEC standards. This allows for the possibility that some studies may not have provided specific components addressed in the current standards, thereby preventing the study from being considered as contributing to the evidence base. Other reviews have described similar difficulties when applying CEC standards to studies (Houchins, Oakes, & Johnson, 2016; Losinski, et al., 2014; Losinski, Sanders, Ennis, Wiseman, Nelson, & Katsiyannis, in review; Losinski, Wiseman, White, & Balluch, 2016), emphasizing the need for future studies to use the standards as guidelines to build a high quality research base. Moreover, it is vital that null results be published along with those with studies reporting positive results so that we can correctly identify the effectiveness and appropriateness of SRSD as a reading intervention.

Limitations. A number of limitations exist concerning the current research synthesis. First, there are a variety of different SRSD reading comprehension strategies (e.g. TWA, TRAPeR, TRAP), making it is possible that our initial search missed studies meeting the

inclusion criteria. It is possible studies utilizing procedures similar to SRSD, but did not use that specific phrase, were missed in the initial search. However, these studies would likely be identified through the hand and ancestral searches conducted. Our study also included articles not included in previous reviews (Mason, 2013), so it is probable our search included all studies that would have met inclusion criteria. A second limitation is the small number of studies included in the review. Moreover, two of the studies were excluded from effect size calculations due to a lack of sufficient data points. Additional studies, particularly those meeting CEC standards (2014), would provide additional evidence to establish SRSD as an evidence-based practice. Third, this review of literature broadly examined studies that included all types of students with disabilities. There remains a paucity of research into the effectiveness of SRSD reading comprehension strategies, specifically with students with specific disabilities (e.g. those with EBD).

Implications for Future Research. Results of the current research synthesis suggests SRSD as an effective strategy. However, as previously noted, this review broadly included students with all disabilities. Only five studies (six reported outcomes) exclusively included students with EBD. Additional studies are needed to determine the effectiveness of this strategy for students with EBD. Studies including students of various ages and settings should be conducted. For example, the majority of students who participated in the studies were in high school, with only two studies including students in middle school. No studies examining the impact of the intervention on students in elementary school with EBD were conducted, despite the fact the strategy is recommended for use beginning in fourth grade once the shift in reading instruction switches from decoding and fluency to comprehension (Mason et al., 2012). Future research should examine the effects of SRSD reading comprehension strategies in students in

elementary school (grades four through six). Furthermore, since students with EBD are often served within a continuum of services, including in the general education classroom, resource room, self-contained classroom, special-day school and at its most restrictive, a residential facility, all potential settings should be investigated. In this review, four out of five studies whose participants were students with EBD were conducted in the most restrictive settings, special-day schools and residential schools. More research into the effectiveness of SRSD reading comprehension studies in less restrictive settings, such as the general education classroom and resource rooms should be conducted to provide additional information about the impact of SRSD reading methods in various settings.

Conclusion

Overall, results of the current literature review indicate SRSD reading comprehension strategies are effective academic interventions for students with disabilities, including those with EBD. While the extant research is promising, there remains a paucity of studies particularly studies examining the effectiveness of SRSD reading comprehension strategies for students with EBD. Because students with EBD often demonstrate deficits in academics, they may benefit from the implementation of academic interventions (Burke et al., 2015). Aspects of SRSD, particularly the explicit teaching of self-regulation skills, may not only improve these students' academic needs, but may also address behavioral problems such as off-task behavior. Therefore, SRSD is a promising academic intervention for students with EBD and deserves further consideration in future studies.

Chapter 3 - Method

This study utilized a randomized control trial, pre-test/post-test group design. Students at three elementary schools identified with or at-risk for EBD through universal screening and who also demonstrated deficits in reading comprehension were randomly placed in the control and treatment groups. Students in the treatment group were taught the “Think before, think While, and think After” (TWA) strategy during their normal reading strategies class, while members of the control group continued to receive district mandated Tier 2 reading instruction. Analysis of data collected following the intervention lessons sought to answer the following research questions:

1. Does the implementation of the SRSD reading comprehension strategy TWA increase scores on the reading comprehension probes of fourth, fifth, and sixth grade students with or at-risk for EBD?
2. Does the implementation of the SRSD reading comprehension strategy TWA increase student achievement of fourth, fifth, and sixth grade students on benchmark reading tests?
3. Does the implementation of the SRSD reading comprehension strategy TWA increase MAZE scores of fourth, fifth, and sixth grade students with or at-risk for EBD?
4. Do the reading comprehension strategies taught through TWA transfer from expository text to narrative text?

Experimental Design

This study evaluated the SRSD reading comprehension strategy TWA on the reading comprehension of fourth, fifth, and sixth grade students with, or at-risk for, EBD using a randomized control trial (RCT) pretest-posttest design. RCT’s are often referred to as the “gold

standard” for determining the effectiveness of an intervention because they decrease the likelihood that the observed effects are due to alternate factors, while also providing an unbiased assessment of the treatment effects (Cook, Campbell, & Shadish, 2002). Despite the advantages of using RCT’s, factors such as low numbers and the inability to randomize participants often prevent the use of this design in special education research (Odom, Brantlinger, Gersten, Horner, Thompson, & Harris, 2005). However, high quality RCT studies have the potential to add significant evidence to the research base and move closer to identifying evidence-based practices (Odom et al., 2005).

Within the current study, students were randomized at the participant level giving each student an equal chance of being chosen for the control and treatment conditions. In order to ensure no student was prevented from accessing a potentially useful reading strategy, those in the control group were considered on the “wait-list” and received instruction over the TWA strategy following the study. Subsequent to the collection of pre and posttest measures for the control and treatment group, a 2 (TWA or Control) X 6 (FAST aReading, FAST CBM, MAZE, reading comprehension, multiple-choice, short answer) one-way multivariate analysis of variance (MANOVA) was conducted to examine the intervention’s effect.

Setting, Participants, and Materials

Setting.

The participating rural school district in the Midwest portion of the United States was chosen based on its successful implementation of multi-tiered system of supports (MTSS) at all schools. MTSS allows schools to document the academic and behavioral progress of all students and provides additional and specialized services to students demonstrating significant skill deficits. All students are universally screened in math, reading, and social-emotional

development three times a year. Students who require additional supports are placed in Tier 2 (targeted interventions) or Tier 3 (individualized interventions), depending on the level of support needed (Lane, Menzies, Ennis, & Bezdek, 2013). Teachers at the school were trained on the Formative Assessment System for Teachers (FAST), a program that uses computer-adaptive testing (CAT) to help teachers identify students who require additional services in math and reading, and curriculum-based measures (CBM) to monitoring the progress of Tier 2 and Tier 3 students throughout the school year. The district used *FastBridge Learning*, an online program that provided both CAT and CBMs to screen and monitor student progress (Christ, 2017). Specifically, the Social, Academic, and Emotional Behavior Risk Screener (SAEBRS), a FAST program which is a part of *FastBridge Learning*, was used to screen and identify students for Tier 2 and Tier 3 behavior supports (Kilgus, Chafouleas, Riley-Tillman, & von der Embse, 2014). SAEBRS is a validated scale for identifying students who would benefit from behavior and mental health supports (von der Embse, Iaccarino, Mankin, Kilgus, & Maggin, 2016).

Following IRB approval, elementary schools throughout the district were invited to participate in the study. Schools were selected based on student need and the voluntary participation of the principals and Tier 2 and 3 reading teachers. The study took place at two rural, elementary schools with similar demographics. The racial demographics of the first school (S₁) were as follows: 58.4% Caucasian, 16.5% Hispanic, 2.6% Asian, 8.6% African American, and 13.8% identifying as other. Slightly more of the population was male (52%) and 57% of students were eligible for free and reduced lunch. At the second school (S₂), racial demographics were reported as 59.4% Caucasian, 17.7% Hispanic, 1.3% Asian, 11.2% African American and 10.3% other. Fifty-five percent of students were male and 35.5% of students were eligible for free and reduced lunch.

Participants.

Student participants. All students who met the following criteria were invited to participate in the study: (a) they were enrolled in one of the three participating public elementary schools; (b) they were in the fourth, fifth, or sixth grade; (c) during the fall reading screening, they were labeled as “some risk” or “high risk” for reading using the *FastBridge* reading screener taken in the fall; and (d) they were identified by the school needing Tier 2 or Tier 3 supports based on their behavior using the SAEBRS screener. Parental consent was then obtained for students who met the identified criteria.

Within the two participating schools, 31 students were invited to participate in the study; 30 students brought back signed parental consent forms and gave their assent to participate. The grade with the most students was fifth grade ($n = 15$), followed by fourth grade ($n = 10$) and sixth grade ($n = 5$). Of the 30 students, 60% were male and 40% were female. Sixty-seven percent were Caucasian, 10% were Hispanic, 17% were African American, and 6% identified as other. Table 3.1 contains additional descriptive information of student participants.

Table 3.1- Student Characteristics

Variable		Control ($n = 11$)	Treatment ($n = 19$)	Total ($n = 30$)
Grade	4 th	3	7	10
	5 th	5	10	15
	6 th	2	3	5
Gender	Male	6	12	18
	Female	5	7	12
Race	Caucasian	8	12	20
	Hispanic	2	1	3
	African American	-	5	5
	Other	1	1	2
Special Education	Yes	3	7	10
	No	8	12	20

Adult participants. All participating students were assigned to a Tier 2 reading class. These remedial reading classes were taught by teachers, whose titles included special education teacher, Title 1 reading teacher, and general education teacher. All teachers held a valid state teaching license. During the intervention phase, the teachers continued to deliver district mandated reading instruction to the control group only.

The intervention agent, responsible for delivering the strategy instruction and collecting data following the intervention was a 27-year-old Caucasian female who held a Bachelor's degree in secondary education with an emphasis in social studies, a Master's degree in adaptive special education, and was currently a third-year doctoral student. She held teaching licenses from the state in both secondary social studies and secondary adaptive special education and had previously taught for five years at a special-day school for students with severe behavior problems. She had previous experience with the TWA strategy as she had been trained to implement the intervention by another researcher experienced with SRSD.

The intervention occurred during each school's dedicated tiered reading time which was already built into each school's daily schedule. Students were placed into tiered reading classes based on their benchmark reading tests which were given three times a year.

Materials.

Materials utilized in this study were from the book *Building Comprehension in Adolescents: Powerful Strategies for Improving Reading and Writing in Content Areas* (Mason et al., 2012). Using the lessons in the book, detailed checklists were created to be used during instruction and are found in Appendix A. Materials used in the intervention include the TWA Mnemonic Chart, TWA Checklist Worksheet, Learning Strategies Contract, and the Self-Instruction worksheet. Students also used a vocabulary journal to record new words from the practice passages.

Examples of these materials can be found in Appendix B. Additionally, six reading passages from the fourth grade *DIBELS* program were adapted to serve as practices passages for the TWA (Good & Kaminski, 2002) and are found in Appendix C. Finally, students had access to pencils, highlighters, and scratch paper as needed throughout the study.

Outcome Measures

Six measures of reading comprehension were collected during the study: expository reading comprehension questions (three separate scores were collected from these reading probes), benchmark scores from FastBridge, which included a computer adaptive test and oral reading fluency measure, and MAZE probes. Reading comprehension questions, also called question answering scores, are a reading measure used to gauge comprehension. When questions are carefully developed to reflect the whole passage and accurately address the main ideas and key details, question answering scores represent a much more psychometrically sound outcome to measure reading comprehension (Fuchs, Fuchs, & Maxwell, 1988). Computer adaptive testing has become a popular screening tool in schools due to the short amount of time it takes to administer the test and the diagnostic information it provides teachers (Shapiro & Gevhardt, 2012). Oral reading fluency consists of a student orally reading aloud a passage under timed conditions while the teacher counts the number of correct and incorrect words. While oral reading fluency is not traditionally used to assess reading comprehension, there is evidence to support a relationship between reading fluency and comprehension (Fuchs et al., 1988). Finally, MAZE probes, which involve omitting every *n*th word and replacing it with three choices, is another frequently used CBM to measure reading comprehension. Previous research indicates MAZE scores reliably assess growth in reading and is predictive of future growth (Shin, Deno, & Espin, 2000).

Reading Comprehension Probes.

The primary dependent variable was a nonfiction grade level reading comprehension probe. These reading comprehension probes consisted of a mixture of multiple-choice and short answer questions. Currently there are no validated nonfiction reading comprehension passages available, so passages were taken from the website ReadWorks.org (Readworks.org, 2017). In order to provide consistency, all passages had to meet the following criteria: (a) passages had to be tagged with one of the website's science related keywords (physical science, life science, technology and engineering, earth and space science, and sports, health, and safety); (b) be between 300 and 450 words; (c) fall into a pre-identified Lexile range (fourth grade 800 – 900, fifth grade 900-1000, and sixth grade 1000-1100); and (d) include seven multiple-choice questions and three short answer questions. Additionally, passages were reviewed by an elementary school special education teacher and a researcher who specializes in reading instruction. Both reviewers agreed that all passages reflected appropriate reading difficulty for the grade level and the questions measured comprehension of the text.

The reading comprehension probes were administered via paper and pencil in a group setting by the intervention agent during the pretest and posttest. Students were instructed to read the passage carefully and answer the questions at the end of the passage. This measure was untimed and students were given as long as needed to complete the probe. Student answers were then scored using the answer key provided by ReadWorks.org (Readworks.org, 2017). Three total scores were taken from these probes: (a) the total number of questions correct; (b) the total number of multiple-choice questions correct; and (c) the total number of short answer questions correct.

FastBridge Benchmarks.

One of the secondary dependent variables for the study were the fall and winter reading benchmarks collected by the school district. Prior to the beginning of the school year, all teachers and paraprofessionals were trained in the administration of the FastBridge assessments. Three times a year (fall, winter, and spring), students took a reading benchmark test to establish areas of need and to assess student progress. The winter benchmark testing was conducted two weeks following the conclusion of the TWA intervention. Benchmark scores consisted of two measures: aReading and CMBreading (an oral reading fluency measure). Both of these measures were considered transfer measures since they consist of narrative text and the TWA intervention is geared towards increasing the comprehension of expository text.

aReading. aReading is a computer-adaptive measure that takes 15-30 minutes to complete (Christ, 2017). Adaptive assessments such as this one individualizes the test for each student by adjusting the difficulty of questions based on student response. aReading assesses phonemic awareness, phonics, comprehension, and vocabulary through a test of roughly 30 items. Auditory and visual stimuli accompany each question which may be presented as multiple-choice, fill-in-the-blank or true or false (Christ, 2017). High test-retest reliability has been reported for aReading with scores ranging from 0.71 – 0.87 (Center on Response to Intervention, 2016). Research into the validity of aReading tests indicate it a strong predictor of growth (range 0.64 – 0.84; Center on Response to Intervention, 2016). Additionally, research into the concurrent validity suggests the measure is highly correlated with other reading comprehension measures (range of 0.69 – 0.83; Center on Response to Intervention, 2016). aReading tests were administered to students at the school three times during the school year:

fall, winter, and spring. The computer automatically scored the assessment, providing a report to teachers detailing areas of need for each student.

CBMreading. A curriculum-based measurement for reading was the second component given as a reading benchmark test by the school district. Students were provided with a short passage of a grade-level text. The text was a mix of expository and narrative stories. Students read aloud the passage for one minute while the teacher took data on the total words read (including correct and incorrect responses), the total number of errors and the words read correct per minute. There is high test-retest reliability reported for the CBMreading measures with scores ranging from 0.89 - 0.94 (Center on Response to Intervention, 2016). When compared to other established reading measures, such as AIMSweb and DIBELS NEXT, the concurrent validity is 0.985 (Center on Response to Intervention, 2016).

DIBELS Daze.

The final dependent variable utilized to assess reading comprehension of students was Daze, the standardized *DIBELS* version of MAZE procedures (Good & Kaminski, 2011). In Daze passages every 7th word is replaced with a box containing three words, one of which is correct. Students use background information, prior knowledge, word recognition, and their ability to construct meaning from the text to choose the appropriate word, all skills that are considered a part of reading comprehension. Previous research reported high inter-rater reliability for fourth grade (e.g. above .98 for single form; above .99 for three forms), fifth grade (e.g. above .99 for single form; 1.00 for three forms) and sixth grade measures (above .99 for single form; above 1.00 for three forms; Good, Kaminski, Dewey, Wallin, Powell-Smith, & Latimer, 2013). High alternative-form reliability has also been described for fourth grade (above .74 for single form; above .99 for three forms), fifth grade (above .66 for single form; above .85

for three forms) and sixth grade (above .79 for single form; above .89 for three forms; Good et al., 2013). Additionally, predictive validity coefficients for the Daze adjusted scores (fourth grade: 0.67; fifth grade: 0.56; sixth grade: 0.60) and concurrent validity coefficients (fourth grade: 0.68; fifth grade: 0.66, and sixth grade: 0.64) are in the moderate-strong range, indicating Daze assessments are good for measuring reading comprehension of students (Good et al., 2013). This dependent variable served as another transfer measure as Daze passages consist of narrative text and the TWA strategy teaches the comprehension of expository text.

The intervention agent administered the Daze reading passages in a group format using the standardized directions provided by *DIBELS* (Good & Kaminski, 2013). These directions were read exactly as written for each group. Daze passages are timed and students had three minutes to complete as much of the probe as possible. To acquire the Daze Adjusted Score, the number of incorrect responses was divided by two and subtracted from the number of correct responses (adjusted scores = number of correct responses – [number of incorrect responses ÷ 2]).

Interobserver agreement. (IOA) was collected for the compilation of data. A graduate student was trained to check the scoring of the reading comprehension passages. The graduate student was given the answer key used by the researcher and independently scored 30% of the reading comprehension probes, with an IOA of 100% with no disagreements between raters. IOA was calculated by summing the number of agreements and dividing by the number of agreements and disagreements and then multiplying the number by 100 (Gast & Ledford, 2014).

Procedures

At the beginning of the school year, all students in the school district were universally screened using *FastBridge's* aReading and oral reading fluency scores (Christ, 2017). Based on their scores, schools had placed students into Tier 1, Tier 2, or Tier 3 reading intervention

groups. Students in Tier 2 and Tier 3 in reading groups were assigned to groups that focused on skills such as phonics, fluency and comprehension. Schools used weekly oral retell CBM's from *FastBridge* to track student progress (Christ, 2017). Per district mandate, schools continued to give students in the treatment and control group weekly reading CBM's throughout the study.

Participating students were all assigned to either a Tier 2 or Tier 3 reading group and were randomly assigned to the treatment or control group. The treatment group was further split into five groups based on the school and then grade level. This allowed students from the treatment groups to receive the TWA intervention during their normally scheduled tiered reading time. Both the control and treatment group were pretested on the first day and then received the same amount of instructional time within an eleven-day period, during which the treatment group was taught TWA and the control group engaged in their regular tiered reading activities. Finally, students in both groups were tested again to collect posttest data.

Control Group.

The curriculum used by the district was from the company 95% Group Inc. and was called Comprehension (Hall, 2014). This comprehensive program provided direct and explicit instruction on the comprehension skills of connecting, questioning, predicting, imagining, inferring, determining importance, and synthesizing. These skills were taught separately before being combined so that students learned individual skills first before using them together. There was no specific behavior intervention (e.g. the instruction of self-regulation skills) used with the control group. Students in the control group continued to receive this reading instruction throughout the intervention and had no access to the TWA intervention. All TWA materials were collected by the intervention agent following instruction to ensure the control group did not have access to the materials.

Treatment Group.

Following the collection of pretest data, students in the treatment group began the TWA lessons, taught by the intervention agent. Lessons were completed at the two elementary schools over the course of 11 days to the five treatment groups. There were two fourth grade groups, two fifth grade groups, and one sixth grade group. At the first school (S₁), students were instructed in the tiered reading room. The room consisted of a teacher's desk, a horseshoe shaped desk, and four individual student desks pushed up against the wall. At the second school (S₂), the intervention was delivered in one of the conference rooms which contained a large oval table. The number of students in the groups ranged from two to eight. Teacher notes suggest students fully participated in the majority of the lessons, although in the two larger groups (four and eight students) some students complained that the noise level during partner work made it difficult to concentrate.

The lessons, which are based on those found in *Building Comprehension in Adolescents: Powerful Strategies for Improving Reading and Writing in Content Areas* (Mason et al., 2012), were shortened slightly. This was to conform to the 30-minute tiered reading strategy time already scheduled by the school. No steps were eliminated, but shorter passages were utilized (1-2 paragraphs) during the strategy practice. Also, only one vocabulary word was taught, rather than the three vocabulary words taught in the original lessons.

Lesson 1. During the first lesson students were introduced to the TWA strategy and the group discussed how it can help students obtain information from text. Students were introduced to the vocabulary journal and filled out a commitment sheet, agreeing to learn the strategy.

Lesson 2. The second lesson developed background knowledge of students, modeled the TWA strategy for students, and taught self-regulation skills. The intervention agent modeled

each step of the strategy using a short reading passage, verbally expressing her thought process. She pointed out when she used self-instructions and how it assisted her in reading and comprehending the passage. At the end of the lesson, students filled out the self-instruction worksheet, creating self-statements to be used with the strategy.

Lesson 3. Students practiced the TWA strategy together as a group. Students were praised for using self-instruction statements. The intervention agent emphasized how to identify key information from the text during the last step of the strategy.

Lesson 4. The fourth lesson offers another opportunity for students to practice the TWA strategy as a group with the teacher providing assistance as necessary. By the end of this lesson, most students had the strategy memorized.

Lesson 5. Students were orally quizzed at the beginning of the lesson over the TWA steps. During this lesson supports (highlighters, TWA checklist) were faded gradually. Students practiced the strategy with faded supports in pairs or independently. Some students expressed a desire to continue using the highlighters rather than transition to making the passage with pencil. This was permitted as it is logical to assume students would have access to highlighters or colored markers in their classrooms and would be able to generalize this step.

Lesson 6. Students practiced the TWA strategy in pairs or individually. Support from the intervention agent was almost completely faded. At the end of the lesson, the students devised a plan for maintenance (e.g. using it when taking CBMs, when to use it in classes).

Posttest Data Collection. To evaluate the effect of the interventions, posttest data was collected from both the control group and treatment group. The day after the conclusion of the intervention, all students, from the treatment and control group, were given a MAZE passage and reading comprehension probe in a group format. Teacher notes indicate some of the students

struggled to stay focused during the post testing. A few of the students from the treatment group struggled to focus on their own work and repeatedly requested permission to explain how to use the strategy to members of the control group. Additionally, one student from the treatment group put his head down and refused to begin the reading comprehension probe. When the intervention agent questioned the student, he admitted he was not working in hopes she would return the next day. Upon being told that was not a possibility, he quickly rushed through his reading comprehension probe.

To complete posttest data collection, teachers at each school administered the FastBridge winter reading benchmark test during the first week of December and provided the scores to the intervention agent.

Treatment Fidelity

Treatment fidelity data were collected through a completion of a daily lesson checklist. Each checklist explicitly listed the lesson steps, teacher prompts, and teacher actions. The intervention agent completed a checklist for 100% of the TWA lessons and noted any circumstances that prevented steps from being completed. Fidelity collected by the intervention agent ranged from 85-100% with an average of 98.7%. Fidelity data was calculated by taking the sum of completed steps, divided by the total number of steps and multiplying by 100 (Gast & Ledford, 2014). All missed steps came from the 'wrap up' portion of the lesson and generally included steps such as a review of the vocabulary word and asking if students wanted to change anything on their self-instruction sheets. The intervention agent chose not to complete these steps at the beginning of the next lesson as they were minor activities usually reviewed at some point during the following lesson. To collect treatment fidelity data, a graduate student trained to complete the fidelity checklist sat in on 30% of the lessons spread throughout the entire

intervention. Following the lesson, both checklists were compared to determine the extent that the procedures were followed. Of the observed sessions, the intervention agent and graduate student reached 100% agreement on the completed steps.

Social Validity

Social validity evaluates the social importance and acceptability of the intervention (Horner, Carr, Halle, McGee, Odom, & Wolery, 2005) and was assessed upon completion of the study. A key feature of social validity is that the intervention(s) should address a problem important to both society and the individual, one that if not solved could have long-lasting consequences (Kazdin, 2011). The improvement of reading comprehension fits both criteria as literacy provides benefits on both an individual and societal level. Students who are not able to comprehend text are likely to face both individual and social consequences as a result (e.g. hold lower paying jobs). Therefore, increasing student reading comprehension is a socially valid goal.

Goal. Social validity can be assessed through a demonstration that the intervention assisted students in meeting a pre-set goal (Horner et al., 2005). The goal for students receiving this intervention was to move out of the “some risk” or “high risk” category for reading comprehension by the winter benchmark. This was measured by comparing fall and winter benchmark comprehension scores of participating students. The goal is for participating students to no longer meet diagnostic criteria of being at-risk for academic deficits in the area of reading comprehension (Kazdin, 2011).

Effects. Another way social validity can be measured is by determining if the intervention produced the desired overall effect (Horner et al., 2005). In this case, the goal is to see students cease a dysfunctional behavior (not being able to comprehend text; Kazdin, 2011). This behavior is considered dysfunctional because not being able to understand text prevents

students from being successful both at school and in daily life. Social validity is measured by examining the overall change in student scores with the use of the SRSD strategy TWA. Scores will be evaluated to identify if one intervention produced significantly higher results.

CURP. Finally, social validity was assessed by judging its acceptance by the students (Horner et al., 2005). To gather this information, students were given the Children's Usage Rating Profile (CURP; Briesch & Chafouleas, 2009), a measure designed to gather student opinions about an intervention. The CURP uses a rating scale consisting of 21 questions answered on a four-point, Likert-type scale. Student responses to the intervention are split into three factors that provide information about personal desirability, feasibility, and understanding of the intervention. An average is calculated for each of the three factors, with a minimum score of zero and a maximum score of four. High scores for personal desirability and understanding and low scores for feasibility indicate high acceptability. Students from the treatment group were given the CURP following the posttest. An example of the CURP can be found in Appendix D.

Data Analysis

Baseline equivalence between the treatment and control group was established through an independent t-test on the pretest MAZE scores and pretest reading comprehension scores. Then, a one-way MANOVA, which measures multiple dependent variables in one statistical analysis, was used to determine if there were significant differences in any of the six dependent variables. MANOVA was used instead of separate two-way repeated measures analysis of variance (ANOVA) in order to decrease the chance of committing a Type 1 error. A Type 1 error occurs when a null hypothesis is incorrectly rejected, resulting in a 'false positive.' Descriptive statistics consisting of means and standard deviations for each of the dependent variables were also

reported. All analyses were conducted using R Statistical Package (Version 3.4.1). The significance level for all analyses was set at $p < 0.05$.

Chapter 4 - Results

Baseline equivalence between the treatment and control groups were established prior to analysis. Independent t-tests were conducted on the MAZE pretest ($t = -1.20, p = 0.24$) and reading comprehension pretest ($t = 0.32, p = 0.75$), indicating no significant difference between the treatment and control group. This indicated that both the treatment and control group were similar in reading ability prior to the TWA intervention. Results of, Levene's Test for Homogeneity of Variance showed the F value was equal to 0.05 ($p > 0.05$) which meets the assumption of homogeneity of variances. Descriptive statistics, including means and standard deviations of all six dependent variables are reported in Table 4.1.

Table 4.1 Descriptive Statistics

<i>Measure</i>	<i>Treatment Group (n =19)</i>				<i>Control Group (n =11)</i>			
	<i>Pretest</i>		<i>Posttest</i>		<i>Pretest</i>		<i>Posttest</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
MAZE	12.68	6.66	13.05	5.76	15.27	5.04	11.86	7.13
Reading Comp.	3.84	1.71	5.89	2.13	3.64	1.69	6.09	1.30
Multiple-Choice	3.79	1.58	4.21	1.65	3.36	1.43	4.63	1.36
Short Answer	0.16	0.50	1.74	0.99	0.09	0.30	1.45	0.52
FAST aReading	500.16	14.58	520.16	67.20	504.73	13.78	507.63	14.71
FAST Oral Fluency	95.53	25.56	113.58	24.92	94.36	20.24	121.73	31.79

The MANOVA suggested there was no significant difference in the reading performance of the treatment and control group following the TWA intervention, $F(6, 23) = 1.26, p = .314$; Wilk's $\Lambda = 0.008$. Results of univariate F tests are reported in Table 4.2.

Table 4.2 Univariate F Scores

	<i>SS</i>	<i>F</i>	<i>p</i>
MAZE	9.85	0.25	0.621
Reading Comprehension	0.27	0.08	0.784
Multiple-Choice	1.26	0.52	0.476
Short Answer	0.56	0.76	0.390
FAST aReading	1092	0.37	0.550
FAST Oral Fluency	462.6	0.61	0.442

Note: SS = Sum of Squares

Social Validity

The TWA intervention did not produce the overall desired effect of significantly higher results from the treatment group. Results of the CURP and pre-set goal of moving out of the at risk category for reading are reported below.

CURP. The results of the CURP survey indicated students found the intervention generally feasible ($M = 1.86$, $SD = 0.61$; for this category lower mean scores reflect lower levels of intrusiveness and difficulty), understandable ($M = 3.52$, $SD = 0.63$), and personally desirable ($M = 3.53$, $SD = 0.52$). Of the statements that related to feasibility of the intervention (where lower averages indicate lower levels of intrusiveness), the lowest average reported was over the statement “The TWA strategy was too much work for me.” The statement related to feasibility that received the highest average (indicating higher levels of intrusiveness) was “There are too many steps to remember in the TWA strategy.” For the category of understandability, the statement with the highest average ($M = 3.67$; indicating high levels of understanding) was “I understand why the TWA strategy was chosen to help me read better” and the statement with the lowest average ($M = 3.45$) was “I was able to use the TWA strategy correctly.” Finally, for the category of personal desirability, the two statements with the highest average ($M=3.73$) were “The TWA strategy is a good way to help students” and “If my friend was having trouble

reading, I would tell him/her to try this.” The statement with the lowest average in the personal desirability category ($M= 3.13$) was “I could see myself using the TWA strategy again.”

Goal. Social validity was also measured by assessing if students in the treatment group had met the pre-identified goal of moving out of the “some risk” or “high risk” category at the winter benchmark. Two reading benchmark scores were examined to determine if students had met this goal. The first was the aReading test, computer adaptive measure used to measure comprehension. Five students in the treatment group met this goal by moving out of the “some risk” category (26%) as compared to three students in the control group (27%). Additionally, one student in the treatment group moved from the “high risk” category to the “some risk” category. The second benchmark test used by the district to assess reading comprehension was the CBMreading, which measures oral reading fluency. On this benchmark test, three students from the treatment group (15%) and four students from the control group (36%) moved out of the “some risk” category. Furthermore, three students in the treatment group moved from “high risk” to “some risk” (15%), with only one student from the control group achieving the same feat.

Chapter 5 - Discussion

The purpose of this study was to investigate the effectiveness of the SRSD reading comprehension method TWA on the reading comprehension of students with and at-risk for EBD students at the elementary level. Previous reviews have indicated SRSD is an effective academic strategy for students with EBD (Ennis & Jolivette, 2014; Losinski et al., 2014; Sreckovic et al., 2014). However, there is still a paucity of research into the effectiveness of SRSD as an effective reading comprehension strategy for students with EBD. Current research suggests it shows promise for students with disabilities (e.g., Mason, 2013; Mason et al., 2012), but additional investigation into its effectiveness with students with EBD is needed. While five studies have specifically investigated the use of SRSD reading strategies with students with EBD (Ennis, 2016; Hoyt, 2010; Johnson, 2011; Rogevich & Perin, 2008; and Sanders et al., in review), none of these studies were conducted with upper elementary students. Therefore, the current study is the first to examine the impact of a SRSD reading strategy with students with or at risk for EBD in an elementary setting.

A one way MANOVA was used to compare the posttest performance of the treatment and control groups across the six identified dependent variables. Performance on expository reading comprehension probes, MAZE passages, and district benchmark testing were all examined in the analysis. The results of the MANOVA suggested there was no significant difference in the reading performance of the treatment and control group on any of the dependent variables. Further examination of the results of the expository multiple-choice probe, the primary dependent variable, showed the control group ($M = 6.09$, $SD = 1.30$) had slightly higher averages than the treatment group ($M = 5.89$, $SD = 2.13$) on the posttest scores for the overall score. The average scores on the multiple-choice questions from the multiple-choice probe was also slightly

higher for the control group ($M = 4.63$, $SD = 1.36$) when compared to the treatment group ($M = 4.21$, $SD = 1.65$). However, the average scores of the short answer questions were slightly higher for the treatment group ($M = 1.74$, $SD = 0.99$) than the control group ($M = 1.45$, $SD = 0.52$). While none of these differences in scores were found to be significant, the slightly higher average scores of the treatment group on the short answer questions is consistent with the skills taught in the TWA reading strategy. The third part of the strategy, what to do after reading, prompts students to put the main ideas and important details from the passage in their own words. This type of retell requires similar skills needed to answer short answer questions. It is important to emphasize that this difference was not found to be significant.

The secondary dependent variables measured were the reading benchmark scores collected by the district, which included scores on the computer adaptive test and oral reading fluency, and the MAZE probes. These measures were considered transfer measures as the text in these measures was narrative and the TWA intervention is designed to teach students how to read and comprehend expository text (Mason et al., 2012). There are significant differences between the structure and content of narrative and expository text (Mason & Hedin, 2011; Saenz & Fuchs, 2002), which made the secondary dependent variables a measure of the transferability of the skills taught in the TWA intervention to narrative text.

The effectiveness of the intervention was also measured through the district's reading benchmark scores which are used to identify students at-risk in the area of reading. The goal of the intervention was for students in the treatment group to no longer meet diagnostic criteria of being at-risk for deficits in the area of reading comprehension. While some students from the treatment group did move out of a risk category on one or both of the winter benchmark reading tests, it cannot be assumed that this was solely the result of the SRSD reading intervention. To

begin with, students from the treatment group received specialized evidence-based reading instruction prior to the SRSD reading intervention and following the intervention's conclusion. Additionally, roughly the same number of students in the control group also moved out of the risk category, making it feasible that the district reading instruction students received in their normal tier 2 reading class may have contributed to student progress on reading benchmark tests. While it is possible that the SRSD reading intervention TWA may have contributed to some of the treatment group's improvement on the winter reading benchmarks, it is not possible to attribute all improvement to the intervention.

Despite the lack of statistical support for the TWA intervention in the current study, student response to the intervention was significant. Students overwhelmingly rated the intervention high on personal desirability and understanding, and indicated that it was a feasible strategy to utilize in the school setting. Student comments about the intervention included "It was really easy and I'm going to teach my sister" and "I loved this strategy, it was really helpful to me." These high approval ratings, particularly the student belief that the strategy was helpful, suggest that even though statistically significant results were not found, the TWA intervention may still have the potential to be effective in increasing reading comprehension of expository text.

Limitations of the Study

There exist a number of potential limitations that should be considered when interpreting the results of the present study. To begin, one possible limitation is related to the small sample size. Fourth, fifth, and sixth grade students from the two participating schools who were identified as being at-risk for both reading deficits and EBD were invited to join the study. This still resulted in a fairly small sample size of thirty participants, which is common when working

with students with or at-risk for EBD. A second limitation of the study is the effects of maturation. While both schools provided the same Tier 2 reading instruction to the control group, the research team was unable to control the type of reading instruction provided to students in their general education classroom. It is possible that students had been exposed to some of the strategies taught in the TWA intervention by other school personnel. Additionally, the curriculum used to teach the control group in the Tier 2 reading group does provide strategies to promote reading comprehension. Therefore, there is a possibility that outside reading instruction had an impact on the results of the study.

A third limitation of the current study is the possibility of statistical regression, which refers to the possibility that initial scores on the pretests were extreme scores and on subsequent tests, scores moved closer to the mean. Because only one expository reading comprehension pretest was given, it is possible that students initially scored higher on the probe than reflected their actual ability. This possibility is supported by the inclusion of multiple-choice questions in the reading comprehension probes. With multiple-choice questions, students are able to utilize prior knowledge to guess the answer with a 25% chance of getting the question right. This can distort the scores and provide an inaccurate report of a student's actual reading ability (Johnston, 1984). The addition of a second pretest may have better established a more accurate baseline reading level for students in the study and may have affected the overall results.

Finally, one of the biggest limitations to the study centered around the dependent variables. The MAZE probe and both of the district benchmark reading tests all utilized narrative text. Since the TWA intervention specifically teaches how to comprehend expository text, three of the four dependent variables served as transfer measures, and were included to investigate if the skills taught transferred to the comprehension of narrative text. The only dependent variable

that explicitly measured expository text was the expository reading comprehension probe. Three different scores were analyzed from the expository reading probe to examine any potential growth in the reading comprehension of expository text. The overall score of the probe was compared, as well as the correct number of multiple-choice questions (out of seven) and the correct number of short answer questions (out of three). However, the number of multiple-choice questions and short answer questions was small and may not have provided a large enough sample to provide information about the improved comprehension skills of students in the treatment group.

Previous studies that examined the effect of SRSD reading comprehension strategies, such as TWA, have used either oral retell or written retell of an expository passage. However, the criterion validity surrounding the use of oral retell to measure reading comprehension is low (Fuchs et al., 1988). The criterion validity of written retell is slightly higher, but it was decided extensive writing would have been difficult for the majority of students per teacher reports. Therefore, the use of reading comprehension passages was chosen for the primary dependent variable as its criterion validity in measuring reading comprehension is more firmly established (Fuchs et al., 1988). However, the expository reading comprehension probes that were used in this study have not been validated or been tested for reliability. Currently, there are no widely available expository reading comprehension probes that been examined for construct and criterion validity and tested for reliability. While the expository reading comprehension probes were examined by both an elementary special education teacher and a researcher specializing in reading, we are unable to say with certainty that the reading comprehension probes measured the comprehension of the students participating in the study.

Implications for Practice

Even though the current study did not produce statistically significant results, the use of SRSD as a teaching model remains a practical approach to teaching the reading comprehension of expository text. The SRSD model is an evidence-based method with many advantages. To begin, the method addresses academic deficits while providing behavioral support through the use of self-regulation skills. Repeated modeling and practice of the academic skills offers the repetition and scaffolding many students require when learning a new academic concept. Furthermore, the SRSD method allows for the ability to adapt and tailor lessons to individual student needs.

Teachers should also be cognizant of the environment when teaching the strategy. Out of the five treatment groups in the current study, two groups had a larger number of students ($n = 5$ and $n = 8$). For these two groups, the intervention was conducted in the reading intervention classroom which was smaller than the average classroom and included only one horseshoe shaped table made for four to five students. Students in these two groups frequently complained about the lack of space, as the table did not comfortably provide room to have the TWA checklist and reading passage side by side. The self-regulation strategies taught in the TWA intervention call for students to reference and interact with various worksheets, often at the same time. As a result, students may need more desk space than for the traditional worksheet. Additionally, when students were completing the fourth and fifth lessons with partners, some complained about the noise level that increased when students were working with pairs. Providing space for students to spread out during group work decreases potential distractions. It is important to keep in mind that for some students with or at-risk for EBD, environment characteristics such as the lack of space and/or noise level, can impact student ability to learn and apply new academic strategies. Finally,

it is important for teachers to recognize that even after students demonstrate the ability to complete all steps without assistance, some students may lack the self-confidence to initiate or use the strategy when the teacher is not there to provide assistance. It is important to continue to provide scaffolding and guided practice as needed by individual students to foster independence and generalization.

Recommendations for Future Research

In order to provide additional information concerning the effectiveness of SRSD reading comprehension methods, such as TWA, future researchers should seek to develop valid and reliable measures for measuring the reading comprehension of expository text. While there are various valid and reliable measures that assess the comprehension of narrative text, there are none widely available for expository text. Because of the significant differences in the structure and content of expository and narrative text, the development of valid and reliable expository reading comprehension probes, particularly those utilizing multiple-choice questions, is necessary. The development of these probes will allow for additional information to be collected on the effectiveness of SRSD reading strategies, such as TWA, that target expository text.

Furthermore, for future studies that use multiple-choice reading comprehension probes as a dependent variable, researchers should consider adding instruction over answering test questions, such as multiple-choice questions, following the use of the strategy. Most of the existing SRSD reading strategies teach students how to paraphrase or orally retell the main ideas and important details. However, some students may not be able to transfer the skills taught in SRSD reading strategies to answering test questions without direct instruction. For example, some students may require explicit instruction on how to transfer the skill of paraphrasing the main idea, to using that information to answer a multiple-choice question about identifying the

main idea. Future research should investigate the impact of adding instruction over answering test questions in conjunction with the SRSD strategy.

Finally, future research should continue to investigate the use of SRSD reading comprehension strategies in an elementary setting. Instruction over reading comprehension skills typically begin in upper elementary as students move from reading to decode text to reading to comprehend text (Mason et al., 2012), but there is still a paucity of research for this age range. One potential area of research includes investigating the different SRSD reading comprehension strategies. For example, in addition to the TWA strategy, there is another SRSD reading method called TRAP (Mason et al., 2012). Like TWA, TRAP follows the SRSD model, but contains fewer steps. It is possible that the TRAP strategy is more effective for elementary students who are just beginning to read for comprehension and is a question that should be addressed in future research. Finally, research should continue into the effectiveness of SRSD reading strategies for students with and at-risk for EBD, as more research is needed to identify evidence-based strategies for the subpopulation. It is important to note that the null results reported here do not necessarily imply that the TWA does not work. Rather, the results should be interpreted as a part of the entire research base for SRSD reading comprehension strategies, as the results of this study are inconsistent with other TWA studies. One major component of replication research is to identify how an intervention generalizes across different variables. The current study attempted to utilize TWA in an elementary setting, which has previously not been examined by research. Future research into the most effective way of introducing SRSD reading comprehension interventions, such as TWA, to elementary students is necessary to provide information about the generalization of SRSD reading comprehension strategies across grade levels.

Conclusion

Previous research has indicated SRSD reading comprehension methods are effective at increasing the reading comprehension skills of students with disabilities, including students with and at-risk for EBD (Mason, 2013; Mason et al., 2012). This RCT study sought to provide additional research on the effectiveness of the SRSD method TWA with elementary students with and at-risk for EBD. In the current study, there were no statistically significant results that indicated the TWA strategy improved the treatment group's reading comprehension of expository text. However, students reacted positively to the strategy, indicating they felt it was useful and helpful in aiding in reading comprehension. High social validity, combined with questions over the reliability and validity of the primary dependent variable, indicate a need for additional research into SRSD reading comprehension methods with elementary students with and at-risk for EBD.

References

Note. References with a * are those included in the literature review.

- Al Otaiba, S., & Fuchs, D. (2002). Characteristics of children who are unresponsive to early literacy intervention: A review of the literature. *Remedial and Special Education, 23*, 300-316.
- Banks, G. C., Kepes, S., & Banks, K. P. (2012). Publication bias: The antagonist of meta-analytic reviews and effective policymaking. *Educational Evaluation and Policy Analysis, 34*, 259-277.
- Barton-Arwood, S. M., Wehby, J. H., & Falk, K. B. (2005). Reading instruction for elementary-age students with emotional and behavioral disorders: Academic and behavioral outcomes. *Exceptional Children, 72*, 7-27.
- Benner, G. J., Nelson, J. R., Ralston, N. C., & Mooney, P. (2010). A meta-analysis of the effects of reading instruction on the reading skills of students with or at risk of behavioral disorders. *Behavioral Disorders, 35*, 86-102.
- Berkeley, S., Scruggs, T. E., & Mastropieri, M. A. (2010). Reading comprehension instruction for students with learning disabilities, 1995—2006: A meta-analysis. *Remedial and Special Education, 31*, 423-436.
- Briesch, A. M., & Chafouleas, S. M. (2009). *Children's Usage Rating Profile (Actual)*. Storrs, CT: University of Connecticut.
- Bullis, M., & Cheney, D. (1999). Vocational and transition interventions for adolescents and young adults with emotional or behavioral disorders. *Focus on Exceptional Children, 31*(7), 1-24.

- Burke, M. D., Boon, R. T., Hatton, H., & Bowman-Perrott, L. (2015). Reading interventions for middle and secondary students with emotional and behavioral disorders: A quantitative review of single-case studies. *Behavior Modification, 39*, 43-68.
- Carter, E. W., Lane, K. L., Pierson, M. R., & Glaeser, B. (2006). Self-determination skills and opportunities of transition-age youth with emotional disturbance and learning disabilities. *Exceptional Children, 72*, 333-346.
- Carter, E. W., & Wehby, J. H. (2003). Job performance of transition-age youth with emotional and behavioral disorders. *Exceptional Children, 69*, 449-465.
- Center on Response to Intervention. (2016). *FAST: Adaptive Reading*. Retrieved from <http://www.rti4success.org/>
- Christ T. J. (2017). FastBridge Learning, Retrieved September 6, 2017, from <http://www.fastbridge.org>
- Clarke, S., Dunlap, G., & Stichter, J. P. (2002). A descriptive analysis of intervention research in emotional and behavioral disorders from 1980 through 1999. *Behavior Modification, 26*, 659-683.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). New York, NY: Lawrence Erlbaum.
- Comprehensive Meta-Analysis. Version 2.2.064 [Computer software]. Englewood, NJ: Biostat.
- Cook, B. G., Buysse, V., Klingner, J., Landrum, T. J., McWilliam, R. A., Tankersley, M., & Test, D. W. (2015). CEC's standards for classifying the evidence base of practices in special education. *Remedial and Special Education, 36*, 220-234.
- Cook, B. G., & Odom, S. L. (2013). Evidence-based practices and implementation science in special education. *Exceptional Children, 79*, 135-144.

- Cook, T. D., Campbell, D. T., & Shadish, W. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton Mifflin.
- Council for Exceptional Children (2014). *Council for Exceptional Children standards for evidence based practices in special education*. Retrieved from <https://www.cec.sped.org/~media/Files/Standards/Evidence%20based%20Practices%20and%20Practice/EBP%20FINAL.pdf>
- Coutinho, M. J. (1986). Reading achievement of students identified as behaviorally disordered at the secondary level. *Behavioral Disorders, 11*, 200-207.
- Cullinan, D., & Sabornie, E. J. (2004). Characteristics of emotional disturbance in middle and high school students. *Journal of Emotional and Behavioral Disorders, 12*, 157-167.
- Deshler, D. D., & Schumaker, J. B. (1993). Strategy mastery by at-risk students: Not a simple matter. *The Elementary School Journal, 94*, 153-167.
- Dunlap, G., & Childs, K. E. (1996). Intervention research in emotional and behavioral disorders: An analysis of studies from 1980-1993. *Behavioral Disorders, 21*, 125-136.
- Duval, S., & Tweedie, R. (2000). Trim and fill: A simple funnel-plot-based method of testing and adjusting for publication bias in meta-analysis. *Biometrics, 56*, 455-463.
- Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *BMJ, 315*, 629-634.
- Engauge Digitizer. Version 4.1 [Computer software]. Retrieved from <http://markummittchell.github.io/engauge-digitizer/>
- *Ennis, R. P. (2016). Using self-regulated strategy development to help high school students with EBD summarize informational text in social studies. *Education and Treatment of Children, 39*, 545-568.

- Ennis, R. P., Evanovich, L., Losinski, M., Jolivette, K., & Kimball, K. (2017). Behavioral, academic, and social characteristics of students with EBD served in a residential facility. *Advances in Learning and Behavioral Disabilities Vol. 40*. Bingley, UK: Emerald Insight.
- Ennis, R. P., & Jolivette, K. (2014). Existing research and future directions for self-regulated strategy development with students with and at risk for emotional and behavioral disorders. *The Journal of Special Education, 48*, 32-45.
- Fang, Z. (2006). The language demands of science reading in middle school. *International Journal of Science Education, 28*, 491-520.
- Fish, M. C., & Mendola, L. R. (1986). The effect of self-instruction training on homework completion in an elementary special education class. *School Psychology Review, 15*, 268-276.
- Forness, S. R., Freeman, S. F., Paparella, T., Kauffman, J. M., & Walker, H. M. (2012). Special education implications of point and cumulative prevalence for children with emotional or behavioral disorders. *Journal of Emotional and Behavioral Disorders, 20*, 4-18.
- Fuchs, L. S., Fuchs, D., & Maxwell, L. (1988). The validity of informal reading comprehension measures. *Remedial and Special Education, 9*, 20-28.
- Gast, D. L., & Ledford, J. R. (2014). *Single case research methodology: Applications in special education and behavioral sciences*. New York, NY: Routledge.
- Gillespie, A., & Graham, S. (2014). A meta-analysis of writing interventions for students with learning disabilities. *Exceptional Children, 80*, 454-473.

- Good, R. H., & Kaminski, R. A. (2013). *Dynamic Indicators of Basic Early Literacy Skills (Next)*. Eugene, OR: Institute for the Developmental Educational Achievement.
Available: <http://dibels.uoregon.edu>
- Good, R. H., Kaminski, R. A., Dewey, E. N., Wallin, J., Powell-Smith, K. A., & Latimer, R. J. (2013). DIBELS next technical manual. Eugene, OR: Dynamic Measurement Group. Inc.
Retrieved from <http://dibels.org>.
- Graham, S., Harris, K. R., & Reid, R. (1992). Developing self-regulated learners. *Focus on Exceptional Children*, 24, 1-16
- Gresham, F. M., Lane, K. L., MacMillan, D. L., & Bocian, K. M. (1999). Social and academic profiles of externalizing and internalizing groups: Risk factors for emotional and behavioral disorders. *Behavioral Disorders*, 24, 231-245.
- Hall, S. L. (2014). 95% Group Inc, Retrieved September 13, 2017, from <http://95percentgroup.com>
- Harris, K. R., & Graham, S. (1999). Programmatic intervention research: Illustrations from the evolution of self-regulated strategy development. *Learning Disability Quarterly*, 22, 251-262.
- Harris, K. R., Graham, S., Mason, L. H., & Friedlander, B. (2008). *Powerful writing strategies for all students*. Baltimore, Maryland: Paul H. Brookes Publishing Co., Inc.
- Harris, K. R., Reid, R. R., & Graham, S. (2004). Self-regulation among students with LD and ADHD. *Learning About Learning Disabilities*, 3, 167-195.
- *Hedin, L. R., Mason, L. H., & Gaffney, J. S. (2011). Comprehension strategy instruction for two students with attention-related disabilities. *Preventing School Failure*, 55, 148-157.

- Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children, 71*, 165-179.
- Houchins, D. E., Oakes, W. P., & Johnson, Z. G. (2016). Bullying and students with disabilities: A systematic literature review of intervention studies. *Remedial and Special Education, 37*, 259-273.
- *Howorth, S., Lopata, C., Thomeer, M., & Rodgers, J. (2016). Effects of the TWA strategy on expository reading comprehension of students with autism. *British Journal of Special Education, 43*, 39-59.
- *Hoyt, L. R. (2010). *The effects of self-regulated strategy development (SRSD) on reading comprehension for secondary students with emotional and behavioral disabilities (EBD)*. (Doctoral dissertation). University of Washington: Washington.
- Individuals with Disabilities Education Improvement Act, 20 U.S.C. § 1415 et seq. (2004).
- *Johnson, J. W. (2011). *The effect of strategy instruction on the reading comprehension of high school students with ADHD*. (Doctoral Dissertation). University of Nebraska: Lincoln.
- *Johnson, J. W., Reid, R., & Mason, L. H. (2012). Improving the reading recall of high school students with ADHD. *Remedial and Special Education, 33*, 258-268.
- *Johnson, L., Graham, S., & Harris, K. R. (1997). The effects of goal setting and self-instruction on learning a reading comprehension strategy: A study of students with learning disabilities. *Journal of Learning Disabilities, 30*, 80-91.
- Johnston, P. (1984). Prior knowledge and reading comprehension test bias. *Reading Research Quarterly, 19*, 219-239.

- Kauffman, J. M., & Landrum, T. J. (2018). *Characteristics of emotional and behavioral disorders of children and youth (10th edition)*. Upper Saddle River, NJ: Pearson.
- Kaufman, P., Alt, M. N., & Chapman, C. D. (2004). Dropout Rates in the United States: 2001. Statistical Analysis Report (NCES 2005-046). U.S. Department of Education. National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.
- Kazdin, A. E. (2011). *Single-case research designs: Methods for clinical and applied settings*. Oxford University Press.
- Kilgus, S. P., Chafouleas, S. M., Riley-Tillman, T. C., & von der Embse, N. P. (2014). Social, Academic, and Emotional Behavior Risk Screener (SAEBRS). Minneapolis, MN: Theodore J. Christ & Colleagues.
- Landrum, T. J., Tankersley, M., & Kauffman, J. M. (2003). What is special about special education for students with emotional or behavioral disorders? *The Journal of Special Education, 37*, 148-156.
- Lane, K. L., Barton-Arwood, S. M., Nelson, J. R., & Wehby, J. (2008). Academic performance of students with emotional and behavioral disorders served in a self-contained setting. *Journal of Behavioral Education, 17*, 43-62.
- Lane, K. L., Menzies, H. M., Ennis, R. P., & Bezdek, J. (2013). School-wide systems to promote positive behaviors and facilitate instruction. *Journal of Curriculum and Instruction, 7*(1), 6-31.
- Lane, K. L., Wehby, J., & Barton-Arwood, S. M. (2005). Students with and at risk for emotional and behavioral disorders: Meeting their social and academic needs. *Preventing School Failure, 49*, 6-9.

- Lange, A., Richard, R., Gest, A., De Vries, M., & Lodder, L. (1998). The effects of positive self-instruction: A controlled trial. *Cognitive Therapy and Research*, 22, 225-236.
- Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P., ... & Moher, D. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *PLoS Medicine*, 6(7), e1000100.
- Lloyd, J. W., Forness, S. R., & Kavale, K. A. (1998). Some methods are more effective than others. *Intervention in School and Clinic*, 33, 195-200.
- Losinski, M., Cuenca-Carlino, Y., Zablocki, M., & Teagarden, J. (2014). Examining the efficacy of self-regulated strategy development for students with emotional or behavioral disorders: A meta-analysis. *Behavioral Disorders*, 40, 52-67.
- Losinski, M., Sanders, S. A., Ennis, R. P., Wiseman, N., Nelson, J., & Katsiyannis, A. (in press). An investigation of co-teaching to improve academic achievement of students with disabilities: A meta-analysis. *Journal of the American Academy of Special Education Professionals*.
- Losinski, M., Wiseman, N., White, S. A., & Balluch, F. (2016). A meta-analysis of video-modeling based interventions for reduction of challenging behaviors for students with EBD. *The Journal of Special Education*, 49, 243-252.
- Maag, J., & Losinski, M. L. (2015). Thorny issues and prickly solutions: Publication bias in meta-analytic reviews in the social sciences. *Advances in Social Sciences Research Journal*, 2, 242-253.

- Maggin, D. M., Wehby, J. H., & Gilmour, A. F. (2016). Intensive academic interventions for students with emotional and behavioral disorders: An experimental framework. *Journal of Emotional and Behavioral Disorders, 24*, 138-147.
- Martins, I. (2002). Visual imagery in school science texts. In J. Otero, J. A. Leon, & A. Graesser. (Eds.), *The Psychology of Science Text Comprehension* (73-90). New York: Routledge.
- Mason, L. H. (2013). Teaching students who struggle with learning to think before, while, and after reading: Effects of self-regulated strategy development instruction. *Reading & Writing Quarterly, 29*, 124-144.
- Mason, L. H., & Hedin, L. R. (2011). Reading science text: Challenges for students with learning disabilities and considerations for teachers. *Learning Disabilities Research & Practice, 26*, 214-222.
- Mason, L. H., Reid, R., & Hagan, J. L. (2012). *Building comprehension in adolescents: Powerful strategies for improving reading and writing in content areas*. Baltimore, Maryland: Paul H. Brookes Publishing Co., Inc.
- *Mason, L. H., Snyder, K. H., Sukhram, D. P., & Kedem, Y. (2006). TWA+ PLANS strategies for expository reading and writing: Effects for nine fourth-grade students. *Exceptional Children, 73*, 69-89.
- Mastropieri, M. A., Scruggs, T. E., Bakken, J. P., & Whedon, C. (1996). Reading comprehension: A synthesis of research in learning disabilities. *Advances in Learning and Behavioral Disabilities, 10*, 201-227.
- Mattison, R. E., & Blader, J. C. (2013). What affects academic functioning in secondary special education students with serious emotional and/or behavioral problems? *Behavioral Disorders, 38*, 201-211.

- McClelland, M. M., Acock, A. C., & Morrison, F. J. (2006). The impact of kindergarten learning-related skills on academic trajectories at the end of elementary school. *Early Childhood Research Quarterly, 21*, 471-490.
- Meichenbaum, D. (1977). Cognitive behaviour modification. *Cognitive Behaviour Therapy, 6*, 185-192.
- Menzies, H. M., & Lane, K. L. (2011). Using self-regulation strategies and functional assessment-based interventions to provide academic and behavioral support to students at risk within three-tiered models of prevention. *Preventing School Failure, 55*, 181-191.
- Miller, A. L., Kiely Gouley, K., Seifer, R., Dickstein, S., & Shields, A. (2004). Emotions and behaviors in the Head Start classroom: Associations among observed dysregulation, social competence, and preschool adjustment. *Early Education and Development, 15*, 147-166.
- Mooney, P., Epstein, M. H., Reid, R., & Nelson, J. R. (2003). Status of and trends in academic intervention research for students with emotional disturbance. *Remedial and Special Education, 24*, 273-287.
- Mooney, P., Ryan, J. B., Uhing, B. M., Reid, R., & Epstein, M. H. (2005). A review of self-management interventions targeting academic outcomes for students with emotional and behavioral disorders. *Journal of Behavioral Education, 14*, 203-221.
- Nelson, J. R., Benner, G. J., Lane, K., & Smith, B. W. (2004). Academic achievement of K-12 students with emotional and behavioral disorders. *Exceptional Children, 71*, 59-73.
- Nelson, J. R., Benner, G. J., Neill, S., & Stage, S. A. (2006) Interrelationships among language skills, externalizing behavior, and academic fluency and their impact on the academic skills of students with ED. *Journal of Emotional and Behavioral Disorders, 14*, 209-216.

- Nelson, R. O., & Hayes, S. C. (1981). Theoretical explanations for reactivity in self-monitoring. *Behavior Modification*, 5, 3-14.
- Odom, S. L., Brantlinger, E., Gersten, R., Horner, R. H., Thompson, B., & Harris, K. R. (2005). Research in special education: Scientific methods and evidence-based practice. *Exceptional Children*, 71, 137–148.
- Ogle, D. M. (1989). The know, want to know, learn strategy. In K. Muth (Eds.), *Children's comprehension of text: Research into practice* (205-223) Newark, Delaware: International Reading Association.
- O'Shaughnessy, T. E., Lane, K. L., Gresham, F. M., & Beebe-Frankenberger, M. E. (2003). Children placed at risk for learning and behavioral difficulties: Implementing a school-wide system of early identification and intervention. *Remedial and Special Education*, 24, 27-35.
- Pustejovsky, J. E. (2016). scdhlms: A web-based calculator for between-case standardized mean differences (Version 0.2) [Web application]. Retrieved from: <https://jepusto.shinyapps.io/scdhlms>
- R Core Team. (2016). R: A Language and Environment for Statistical Computing (Version 3.4.1). [Software]. Available from <http://www.R-project.org>
- Rafferty, L. A., & Raimondi, S. L. (2009). Self-monitoring of attention versus self-monitoring of performance: Examining the differential effects among students with emotional disturbance engaged in independent math practice. *Journal of Behavioral Education*, 18, 279.
- ReadWorks. (n.d.). Retrieved September 15, 2017, from <https://www.readworks.org/>

- Reid, R., Gonzalez, J. E., Nordness, P. D., Trout, A., & Epstein, M. H. (2004). A meta-analysis of the academic status of students with emotional/behavioral disturbance. *The Journal of Special Education, 38*, 130-143.
- *Rogevich, M. E., & Perin, D. (2008). Effects on science summarization of a reading comprehension intervention for adolescents with behavior and attention disorders. *Exceptional Children, 74*, 135-154.
- Rosenblatt, J. A., & Rosenblatt, A. (1999). Youth functional status and academic achievement in collaborative mental health and education programs: Two California care systems. *Journal of Emotional and Behavioral Disorders, 7*, 21-30.
- Rosenthal, R. (1979). The file drawer problem and tolerance for null results. *Psychological Bulletin, 86*, 638-641.
- Ruhl, K., & Berlinghoff, D. H. (1992). Research on improving behaviorally disordered students' academic performance: A review of the literature. *Behavioral Disorders, 17*, 178-190.
- Ryan, J. B., Pierce, C. D., & Mooney, P. (2008). Evidence-based teaching strategies for students with EBD. *Beyond Behavior, 17*(3), 22-29.
- Sáenz, L. M., & Fuchs, L. S. (2002). Examining the reading difficulty of secondary students with learning disabilities: Expository versus narrative text. *Remedial and Special Education, 23*, 31-41.
- Sackett, P. R., & Larson, J. R., Jr. (1990). Research strategies and tactics in industrial and organizational psychology. In M. D. Dunnette & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (pp. 419-489). Palo Alto, CA: Consulting Psychologists Press.

- *Sanders, S. A., Ennis, R. P., & Losinski, M. (in review). The effects of TWA on the science text comprehension of secondary students with emotional and behavioral disorders in a special-day school. *Education and Treatment of Children*.
- Schunk, D. H. (2005). Commentary on self-regulation in school contexts. *Learning and Instruction, 15*, 173-177.
- Scruggs, T. E., Mastropieri, M. A., & Casto, G. (1987). The quantitative synthesis of single-subject research: Methodology and validation. *Remedial and Special Education, 8*, 24-33.
- Scruggs, T. E., & Mastropieri, M. A. (2013). PND at 25: Past, present, and future trends in summarizing single-subject research. *Remedial and Special Education, 34*, 9-19.
- Shadish, W.R., and Haddock, C.K. (2009). Combining Estimates of Effect Size. In H.M. Cooper, L.V. Hedges, and J.C. Valentine (Eds.), *The Handbook of research synthesis and meta-analysis* (2nd ed., pp. 257-277). New York: Russell Sage Foundation.
- Shadish, W. R., Hedges, L. V., Horner, R. H., & Odom, S. L. (2015). The Role of Between-Case Effect Size in Conducting, Interpreting, and Summarizing Single-Case Research (NCER 2015-002) Washington, DC: National Center for Education Research, Institute of Education Sciences, U.S. Department of Education. Retrieved from <http://ies.ed.gov/>
- Shadish, W. R., Hedges, L. V., & Pustejovsky, J. E. (2014). Analysis and meta-analysis of single case designs with a standardized mean difference statistic: A primer and applications. *Journal of School Psychology, 52*, 123-147.
- Shadish, W. R., Zelinsky, N. A., Vevea, J. L., & Kratochwill, T. R. (2016). A survey of publication practices of single-case design researchers when treatments have small or large effects. *Journal of Applied Behavior Analysis, 49*, 656-673.

- Shapiro, E. S., & Gebhardt, S. N. (2012). Comparing computer-adaptive and curriculum-based measurement methods of assessment. *School Psychology Review, 41*, 295-306.
- Shin, J., Deno, S. L., & Espin, C. (2000). Technical adequacy of the maze task for curriculum-based measurement of reading growth. *The Journal of Special Education, 34*, 164-172.
- Siperstein, G. N., Wiley, A. L., & Forness, S. R. (2011). School context and the academic and behavioral progress of students with emotional disturbance. *Behavioral Disorders, 36*, 172-184.
- Sreckovic, M. A., Common, E. A., Knowles, M. M., & Lane, K. L. (2014). A review of self-regulated strategy development for writing for students with EBD. *Behavioral Disorders, 39*, 56-77.
- Swanson, H., & Scarpati, S. (1984). Self-instruction training to increase academic performance of educationally handicapped children. *Child and Family Behavior Therapy, 6*(4), 23-34.
- Talbott, E., Lloyd, J. W., & Tankersley, M. (1994). Effects of reading comprehension interventions for students with learning disabilities. *Learning Disability Quarterly, 17*, 223-232.
- Trout, A. L., Nordness, P. D., Pierce, C. D., & Epstein, M. H. (2003). Research on the academic status of children with emotional and behavioral disorders: A review of the literature from 1961 to 2000. *Journal of Emotional and Behavioral Disorders, 11*, 198-210.
- U.S. Department of Education. (2016). 38th annual report to Congress on the implementation of the Individuals with Disabilities Education Act, 2015. Washington, DC: Author.
- Retrieved from <https://www2.ed.gov/about/reports/annual/osep/2016/parts-b-c/38th-arc-for-idea.pdf>

- Vacha-Haase, T., & Thompson, B. (2004). How to estimate and interpret various effect sizes. *Journal of Counseling Psychology, 51*, 473.
- Valentine, J. C., Tanner-Smith, E. E., Pustejovsky, J. E., & Lau, T. S. (2016). Between-case standardized mean difference effect sizes for single-case designs: A primer. Oslo, Norway: The Campbell Collaboration.
- Vannest, K. J., Temple-Harvey, K. K., & Mason, B. A. (2009). Adequate yearly progress for students with emotional and behavioral disorders through research-based practices. *Preventing School Failure: Alternative Education for Children and Youth, 53*, 73-84.
- von der Embse, N. P., Iaccarino, S., Mankin, A., Kilgus, S. P., & Magen, E. (2017). Development and Validation of the Social, Academic, and Emotional Behavior Risk Screener–Student Rating Scale. *Assessment for Effective Intervention, 42*, 186-192.
- Vygotsky, L. (1978). Interaction between learning and development. *Readings on the Development of Children, 23*(3), 34-41.
- Wagner, M. M. (1995). Outcomes for youths with serious emotional disturbance in secondary school and early adulthood. *The Future of Children, 5*, 90-112.
- Wagner, M., Kutash, K., Duchnowski, A. J., Epstein, M. H., & Sumi, W. C. (2005). The children and youth we serve: A national picture of the characteristics of students with emotional disturbances receiving special education. *Journal of Emotional and Behavioral Disorders, 13*, 79-96.
- Wehby, J. H., Falk, K. B., Barton-Arwood, S., Lane, K. L., & Cooley, C. (2003). The impact of comprehensive reading instruction on the academic and social behavior of students with

- emotional and behavioral disorders. *Journal of Emotional and Behavioral Disorders*, *11*, 225-238.
- Wehby, J. H., Lane, K. L., & Falk, K. B. (2003). Academic instruction for students with emotional and behavioral disorders. *Journal of Emotional and Behavioral Disorders*, *11*, 194-197.
- Wehmeyer, M. L., & Field, S. L. (2007). *Self-determination: Instructional and assessment strategies*. Corwin Press: Corwin.
- What Works Clearinghouse. (2014). Procedures and standards handbook (Version 3.0). Washington DC: Institute of Education Sciences. Retrieved from http://ies.ed.gov/ncee/wwc/pdf/reference_resources/wwc_procedures_v3_0_standards_handbook.pdf
- Woltman, H., Feldstain, A., MacKay, J. C., & Rocchi, M. (2012). An introduction to hierarchical linear modeling. *Tutorials in Quantitative Methods for Psychology*, *8*, 52-69.
- Yell, M. L., Meadows, N. B., Drasgow, E., & Shriner, J. G. (2009) *Evidence-based practices for educating students with emotional and behavioral disorders*. Upper Saddle River, NJ: Pearson.
- Zimmerman, B. J., Boekarts, M., Pintrich, P., & Zeidner, M. (2000). A social cognitive perspective. *Handbook of Self-Regulation*, *13*, 695-716.
- Zimmerman, B. J., & Risemberg, R. (1997). Becoming a self-regulated writer: A social cognitive perspective. *Contemporary Educational Psychology*, *22*, 73-101.

Appendix A - Lesson Plan Checklists

Lesson 1: Introduce TWA

Preview:

- Tell the students they will be learning about reading from informational text (1)
- Discuss what good readers do while reading (2)
- Tell students you are going to teach them a strategy for reading that will help them understand more about what they have read and will help them remember the things they read. (3)

Step 1: Introduce TWA

- Display the TWA mnemonic chart (4)
- Emphasize TWA is a strategy that good readers often use before, during and after reading (5)
- Airplane analogy: *“With TWA we can take off with reading! Just like a pilot of a plane, we are the pilots and in control of our reading. Just like a pilot who does specific things before, during and after a plane trip, we need to do things before, during, and after reading.”* (6)

Step 2: Introduce “Think before reading”

- Tell the students there are three steps to complete when you “Think before reading” The first step is to “think about the authors purpose” – uncover the step on the board. (7)
- “Think about the pilot – a pilot thinks about his or her purpose and then has an understanding of where he or she is to go. The author often uses a structure or a map. Thinking about the author’s purpose works in the same way. It lets you know where you are going.”* (8)
- Ask students what they know about this step – discuss how authors write to persuade, inform and for personal expression (9)
- Say *“When we know the author’s purpose, it helps us understand what we are about to read”* (10)
- Discuss how this helps reading (11)
 - If the author has written for personal expression, look for certain things and words. This would look like a story and have characters, places, times, etc.
 - If the author has written to inform, you know to look for information such as main ideas and detail about factual things
- Uncover “think what you know.”- *“Going back to our pilot analogy. The pilot of a plane knows a lot about flying. When pilots know where they are going, they begin to think about what they know – the flight path, the airport, and similar information. When reading thinking about what you know also helps you understand what you are reading. Like a pilot, you create a map with some detail in your head about the topic.”* (12)
- Uncover “think what you want to learn.” – *“A pilot wants to know if there are storms in the flight path, other planes in the flight path, etc. This helps the pilot look for things*

while flying, making the trip easier. Thinking about what you want to learn helps you look for things while reading, therefore making reading easier. (13)

Step 3: Introduce “Think While reading”

- ❑ Tell students there are three things good readers do while reading. This is what we are going to talk about next. (14)
- ❑ Uncover “think about reading speed” *“A pilot must constantly check his or her speed. Going too fast or too slow can have disastrous results. When reading, checking reading speed or pace is something good readers do as well. Reading speed is important because reading too fast or too slow can make it harder for you to understand and remember what was read. We need to read at different speeds sometimes. For example, we might need to read our science text very carefully so we would slow down, but a chapter book we might read very quickly.” (15)*
- ❑ Uncover “thinking about linking what you know.” *“Pilots link what they know about a new situation with what they already know about flying. For example, if a pilot comes upon a storm he or she links how to fly in stormy weather with all the times he or she flew in stormy weather before. It is easier to understand and remember something that is linked to what you already know. Another example would be if I am reading about football, I link all new information about football with what I know – and that’s a lot! When I come to the word ‘touchdown,’ I think of the meaning of the word in my head; if I do not know the meaning, I try to learn it!” (16)*
- ❑ Uncover “rereading parts.” *“A pilot must constantly check his or her instruments. If a pilot doesn’t not understand what the instruments say, he or she keeps reading them. Good readers also check their understanding. When they do not understand, they reread.” (17)*

Step 4: Introduce “Think After reading”

- ❑ Tell students there are three things good readers do after reading:
- ❑ Uncover “the main idea.” *“The first thing a pilot records in his or her log after a trip is the main idea or gist of the trip. For example, ‘I flew a Boeing 747 from Pittsburgh, Pennsylvania to Orlando, Florida.’ This information helps the pilot focus on where he or she has been and sets the stage for reporting the rest of the trip. After reading, good readers think about the main idea of the passage they have read. This helps a reader focus on what he or she has read. For example, if you have read a passage about our school’s gym, your main idea might be ‘our school’s gym has a lot of great sporting equipment.’” (18)*
- ❑ Uncover “summarizing information.” *“A pilot will also write detail to his or her trip logs. For example, if a pilot ran into the storm, he or she would write a statement about the storm then add details such as where the storm occurred, what kind of storm it was, how long the storm lasted, how the plan handled the storm, and other such details. These details are important to the pilot. A pilot will not include trivial detail in his or her summaries. For example, the pilot will not include what he or she had for lunch. That does not have anything to do with flying! Good readers also think about summarizing what they have read in a passage. The details of a passage make it more interesting and help with understanding the author’s message. Another example might*

be if we wanted to add details to a summary about the type of equipment in the gym. You would probably not talk about the bulletin board in the class next to the gym. Good readers and writers also know how to skip trivial details; those details are not important when summarizing. (19)

- Uncover “what you learned.” *“After finishing a trip a pilot shares details of the trip with other pilots, or with his or her family. The pilot may write about the trip for the boss or company. The pilot starts at the beginning and tells what happened with some details included. Using only what has actually happened during the flight, the pilot retells the events of the flight. Good readers can tell what they have learned from reading a passage. Retelling what you have learned in reading helps you understand and remember the information.” (20)*

Step 5: Vocabulary Journal

- Hand each student a journal to be used for vocabulary study. Tell students they will record vocabulary words for the passages read. (21)
- Tell students you will explain and show them how to use the journal in the next lessons. (22)

Step 6: Commitment to Learn the Strategy

- Ask students to “sign up” to learn the strategy and to use the vocabulary journal. Introduce the TWA learning contract. Give each student a learning contract and have them complete it and sign it. (23)
- After they have signed the contract, the teacher should sign them. (24)
- Tell students *“I am committing to do my best in teaching you the TWA strategy and to help you identify important words in the text to be read.” (25)*

Step 7: Memorization Practice

- Have students write out the mnemonic for TWA with spaces for the three steps on scratch paper. (26)
- Ask the students to check off spaces as they orally state each step (27)
- Ask students to explain what TWA stands for and why it is important to use TWA before, while, and after reading. (28)
- Review the nine steps orally. (29)
- Stress that using TWA helps reading and give an example (30)

Wrap Up:

- Tell students they will need to come to the next class and write out the TWA mnemonic and tell what it means from memory. Give each student a TWA mnemonic chart to study. (31)

Total Steps Completed _____/Total Steps Possible (31) _____ = _____ *100= _____
Observer _____

IOA: Yes No

2nd Observer: _____

Smallest # of Observed Steps _____/Largest # of Observed Steps _____ = _____ *100= _____

Adapted from Mason, Reid, and Hagaman, 2012

Lesson 2: Modeling TWA

Practice:

- Ask them what each letter stands for. (1)
- Have students practice the steps of TWA (saying it aloud, matching up the steps, writing it out, etc). (2)
- Ask students if they remember why it is important to use TWA. Let them give examples on how TWA can help in reading. (3)

Step 1: Vocabulary Journal

- Tell the students that in this lesson you will use the vocabulary journal for new vocabulary words in preparation for text reading. (4)
- Introduce and teach new vocabulary word in preparation for reading the passage “Bats are Not Birds.” (5)
 - mammal
- Provide and discuss links between the word and the students’ world knowledge. (6)
- Ask students to write the definition in their vocabulary journal. Have students give an example sentence with each vocab word. (7)

Step 2: Model TWA, goal setting, self-monitoring, self-statements

- Tell students you will show them how TWA works when reading a passage (8)
- Tell students TWA works especially well for passages that contain information about people, places, and things. (9)
- Tell them that you will go through all the steps of TWA with the passage called “African Drums.” Let them know that you will be reading and thinking aloud so that they can see all the TWA steps. (10)
- Introduce the checklist. Show the students the self-monitoring checklist that you will use when reading the passage. Tell them you will show them how to use the checklist (11)
- Model the whole reading process using TWA with self-statements to guide you. Tell students that over the next few lessons they will be getting a lot of practice each step. (12)
- “I have a passage to read. Using TWA will help me understand and remember the passage. What is the first thing I should do? The first thing I need to do is to think about three things before reading. First, I need to think about the author’s purpose. Well I can do this. The title is ‘Bats Are Not Birds.’ I should read the first couple of sentences. Okay. The author is stating that bats and birds are different animals. They have some similarities but they are not the same. The author’s purpose is to tell us about, or to describe the differences between bats and birds. I know that when an author writes to provide and describe information, he will be writing information with main ideas and details (check off monitoring sheet.) The next thing I need to do is to think about what I know. I know a lot about bats and birds. (13)*
- Share some information about what you know about bats and birds with the students. Include and briefly discuss the targeted vocabulary word. (14)
- Check off the monitoring sheet (think about what you know). (15)

- "Next I need to think about what I want to learn (Share your questions. Check off monitoring sheet.) I have checked the three steps to think before reading. I am ready to read. (16)*
- Start reading at a normal speed, then, sped up. SAY *"Whoa, slow down, this is not making sense. I can see on my TWA check sheet that I need to think about reading speed; I will slow down so I can understand what I am reading. Stopping at punctuation is a good way to monitor this." (17)*
- Read at an acceptable speed, stopping when you come to something to link knowledge (Model how to link information) (18)
- Read until you come to something you do not understand. SAY *"This doesn't make sense. (Re-read and tell the students to check the vocabulary journal if they don't remember the meaning of a word) "Oh, I understand now. Using the strategy is really helping me understand this information. "(19)*
- Finish reading the passage, modeling each steps again. (20)
- Follow these procedures for reading the entire passage. Be sure to note all vocabulary words. (21)
- "I really think I know a lot more about the differences between bats and birds now. What do I need to do next? After reading, think about...Well, the first step is to think about locating the main ideas and summarizing each paragraph? (Introduce markers.) I will use these markers to help me identify main ideas and important details. I will start this with the first paragraph in the passage." (22)*
- Using the yellow marker, highlight phrases and sentences critical to the main idea.
- Check off monitoring sheet for the main idea. (23)
- Model how to highlight supporting details in pink (24)
- SAY *"What do I need to do next? I also need to take out any information that is not important. (25)*
- Cross out in pencil the details you want to eliminate. (26)
- Model summarizing the information. (27)
- Check off monitoring sheet for details. (28)
- Follow these procedures recursively for summarizing each paragraph in the passage. Use coping statements such as *"This is taking a long time, but I know I will get faster with practice." (29)*
- "Now I can retell what I read and learned in the passage. This will be easy as I have all the main ideas and details highlighted." (30)*
- Model how to state a retell. (31)
- Check off the monitoring sheet for stating a retell. (32)

Step 3: Reinforce performance

- Review TWA checklist with students. Ask if all parts are complete. If so, model writing a star on the checklist paper. (33)

Step 4: Develop Self-Instructions

- Give each student a blank copy of the self-instruction sheet. Explain that they will use the paper for recording some things they can say to themselves when reading with TWA. Stress that the things you said to yourself helped you remember the TWA

Lesson 3: Group Collaborate Practice

Practice:

- Practice the nine steps of TWA. If students have trouble with the parts, give them a few minutes to practice. (1)
- Ask students if they remember why it is important to use TWA. Let them give examples on how TWA can help in reading (2)

Step 1: Vocabulary Journal

- Introduce and teach new vocabulary words in preparation for reading of the text “A Happy House Plant” (3)
 - stalks
- Provide and discuss the links between the word and world knowledge (4)
- Ask students to write the definition and give an example sentence. (5)

Step 2: Collaboratively complete “Think before” and “While reading” steps

- Give each student a copy of the passage “A Happy House Plant” and a TWA checklist. Tell students to get their TWA self-instructions sheets and remind them to refer to the self-instructions, especially when they have difficulty with one of the steps. (6)
- Set a goal to use all steps of TWA and tell the students you expect them to help monitor using the strategy by check in their own TWA checklist for each step. (7)
- Collaboratively decide “the author’s purpose.” The author’s purpose is to inform and to provide information about house plants. (8)
- Ask students what kind of things should be looked for in informational writing. Note that you will be looking for main ideas and details about the topic. Check off the TWA checklist. (9)
- Collaboratively complete “think about what you know” and “what you want to learn” steps. (10)
- Check off TWA checklist. (11)

Step 3: Collaborative Read the Passage

- Begin reading the passage “A Happy House Plant” together. Remind students to refer to the TWA self-instruction sheet. (12)
- Discuss reading speed and not that stopping at punctuation is a good way to monitor this (13)
- Evaluate students’ reading speed after each paragraph. (14)
- Ask the class, “*Is there any part we should reread?*” If there is no response, select a section to reread to demonstrate this step. (15)
- After each paragraph orally practice linking knowledge for content and vocabulary word written in the journals. (16)
- Check off the TWA checklist. (17)

Step 4: Main Idea Strategy and Summary for each Paragraph

- Remind students that in the last lesson you used highlighters to help locate the main idea and develop summaries. Explain that for TWA you want the main idea to give

you the “gist” of each paragraph. Explain that this will help you when developing the paragraph summaries and retelling of what you learned. (18)

- Read the first paragraph in “A Happy House Plant.” Together find the sentence in the paragraph that tells the gist of the paragraph. Highlight this sentence in yellow (19)
- Look at the other sentences in the paragraph and SAY “*Are any others important for the gist? Highlight these in yellow.*” (20)
- Develop a main idea statement. Tell the students that these are best if they are in their own words. (21)
- Give each student a pink highlighter and pencil for crossing out non-details. The pencil will help identify which sentences have important details and which have not so important details. (22)
- Discuss each sentence and decide as a group if the sentence has an important detail; if so highlight it in pink. If not cross it out with pencil. (23)
- Tell students you are now ready to develop the summary together. Model how to develop the summary for the first paragraph. Be sure to note that the main idea should be the first part of the summary (24)
- Check off summary off the TWA checklist. (25)
- Collaboratively develop main idea statement and summaries for each paragraph. Check off the TWA checklist as you do this. (26)

Step 5: Collaboratively Think About What You Learned

- Tell the students the class is going to retell the passage in their own words and tell it just like the person listening knows nothing about spider plants.” (27)
- Collaboratively retell. (28)
 - Make sure to include self-instruction to help you with retelling.
 - Remind students a good way to remember all the information is to think of the main ideas and then think about the important details for each main idea.
 - Spend time talking about your thought process in doing a retell
 - You may want to write down student ideas on the board
- Check off TWA checklist sheet for Think about what you learned. (29)

Step 6: Add to self-instruction sheet

- Have students look over their TWA self-instruction sheets (30)
- Add any other statements that may help them in using the strategy (31)

Step 7: Reinforce Performance

- Ask students to look at the TWA checklist. Did they complete all the parts? If so they may star the top of their sheet. (32)

Wrap-Up

- Update learning contracts if needed (33)
- Review the new word in vocabulary journals (34)
- Remind students they will need to come to the next session and say the steps to TWA and tell what it means from memory. (35)

Lesson 4: Peer Practice

Practice:

- Orally practice the nine steps of TWA. If students have trouble with the parts, give them a few minutes to practice. (1)
- Ask students if they remember why it is important to use TWA. Let them give examples on how TWA can help in reading (2)

Step 1: Pair Practice

- Tell students they will use the steps of TWA with a partner. Stress that you will assist them as much as you need to. (3)

Step 2: Vocabulary Journal

- Introduce and teach new vocabulary words in preparation for reading the text from the passage “Flower Parts” (4)
 - pollen
- Provide and discuss the links between the word and world knowledge. Ask students to write the definition in their vocabulary journal. Have students give an example sentence with the vocab word. (5)

Step 3: Complete “Think before reading” and “While reading steps

- Give each students a copy of the passage “Flower Parts” and a TWA checklist. (6)
- Tell students they need to get out their TWA self-instruction sheet and remind them to refer to the statements when needed. (7)
- Tell the students that you want them to complete the first three steps of TWA with their partner (**IF NEEDED THIS COULD BE DONE AS A GROUP OR INDIVIDUALLY BASED ON THE STUDENTS NEEDS). When they finish these steps, they should be ready to report back to the room. (8)
- Tell students to set a goal and use TWA and to use the TWA checklist as they complete the steps. (9)
- Monitor the students’ use of the before reading steps (10)
- Tell students you want them to take turns while reading – one will practice the three steps for “while reading” with the first paragraph, then the other will practice the three steps with the next paragraph and so on. Remind them to use the three steps and to check off the sheet when they have finished reading. (11)
- Remind students to pay attention to the vocabulary word while reading by noting them after reading a sentence or paragraph (12)
- Monitor what the students do while reading. (13)

Step 4: Pair Practice of Main Idea and Summaries for Each Paragraph

- Tell students to work with their partner to develop main idea statements and summaries for each paragraph to share. Tell them they should take turns – one will practice the strategy with the first paragraph, then the other will practice the strategy with the next paragraph (14)
- Tell students to check off the main idea and summary as it is completed (15)

Lesson 5: Fading Instructional Supports

Practice:

- Orally practice the nine steps of TWA. (1)
- Ask students if they remember why it is important to use TWA. Let them give examples on how TWA can help in reading (2)

Step 1: Vocabulary Journal

- Introduce and teach the vocabulary words from the passage “Wind Power” (3)
 - o Coal
- Provide and discuss links between word and world knowledge. (4)
- Ask students to write the definition in their vocabulary journal. Have students give an example sentence (5)

Step 2: Wean off Materials

- Tell students that today you will show them how to use TWA without support materials. (6)
- Show students how to create their own check sheet on a blank sheet of paper, similar to the way they created the memorization practice sheet in earlier lessons. (7)
- Using a sample text paragraph from a prior lesson, model how you will not highlight, but write, lightly in pencil “MI” for main idea sentence and “D” for detail sentences on appropriate sentences in the text. (8)
- Tell students they will not have their self-instructions to refer to while reading. They should think about the statements that help them use TWA and continue to use them in their heads. (9)

Step 3: Pair Practice

- Tell students they will set a goal to practice all the steps of TWA with a partner (could also be with a group/individually based on student needs), using their new check sheets and pencils (10)
- Remind them to ask for help if they need it (11)

Step 4: Complete “Think before” and “While reading” steps

- Give each student a copy of the passage “Wind Power” (12)
- Tell students to complete the first three steps of TWA with their partner (13)
- Tell students to use their handwritten TWA checklist. The students should write check marks in the space by “T” as they finish the “Think before reading” steps. (14)
- Tell students to work in pairs to read the passage. Tell them to take turns – one will practice the three steps with the first paragraph, then the other will practice the three steps with the next paragraph, and so on. (15)
- Remind them to check off spaces by the “W” when they have finished reading (16)
- Monitor students while reading. (17)

Lesson 6: Independence and Generalization

Practice:

- Briefly review the nine steps of TWA (1)

Step 1: Pair Practice

- Tell the students that they will use the steps of TWA with a partner. Remind them to check in with you when they finish each step (2)
- Stress that you will assist them as much as needed (3)

Step 2: Vocabulary Journal

- Introduce and teach the vocabulary words from the passage “Amazing Dolphins” (4)
 - o Echo
- Provide and discuss links between word and world knowledge. (5)
- Ask students to write the definition in their vocabulary journal. Have students give an example sentence. (6)

Step 3: Complete “Think before reading” steps

- Give each student a copy of “Amazing Dolphins ” (7)
- Tell students you want them to complete the first three steps of TWA with their partner/group/on their own. When they finish these steps they should report back to you. (8)

Step 4: Pair Practice of “Think While reading” steps

- Tell students to work in pairs to read the passage. Tell them to take turns – one will practice the three steps with the first paragraph, then the other will practice the three steps with the next paragraph, and so on. (9)
- Remind them attend to vocabulary words (10)
- Remind them to check off spaces by the “W” when they have finished reading (11)
- Monitor students while reading. (12)

Step 5: Pair Practice of main idea and summaries for each paragraph

- Let students work in pairs to develop main idea statements and summaries for each paragraph. Instead of highlighting, they should write “MI” for main ideas or “D” for details. (13)
- Tell them you want them to take turns – one will practice the strategy with the first paragraph, then the other will practice the next paragraph, and so on. (14)
- Tell them to check off the main idea and summary spaces by “A” as they are completed for each paragraph. (15)

Step 6: Pair Practice of “think about what you learned”

- Tell students to “think about what you learned” and use the information from their main idea statements and summaries to orally retell the story (16)

Appendix B - Lesson Materials

Vocabulary Journal

Vocabulary Word
Define It!

Vocabulary Word
Define It!

Vocabulary Word
Define It!

TWA Mnemonic Chart

T – Think Before Reading

Think About:

- The author's purpose
- What you know
- What you want to learn

W – Think While Reading

Think About:

- Reading speed
- Rereading parts
- Linking what you know

A – Think After Reading

Think About:

- The main idea
- Summarizing information
- What you learned

Adapted from Harris, Graham, Mason, & Friedlander, 2008

Appendix C – Reading Passages

A Happy House Plant

Many people keep plants in their homes. If you want to have a plant in your home, the first thing to do is decide what kind of plant to buy. If you go to a plant store, you will find many different kinds of plants to choose from. Many people choose a spider plant.

You can probably guess what a spider plant looks like. The plants often grow in hanging baskets. They have green stalks that grow quite long, past the bottom of the container. Eventually, small plants will begin to grow at the ends of the stalks. The small plants look like spiders. If you cut off the small plants and place them in fertile soil, they will grow into new spider plants.

Spider plants are easy to care for. They need to be planted in a rich soil. Make sure the container has small holes in the bottom. When you water the plant, the holes let the extra water drain out. Spider plants do not like to sit and grow in wet soil! The soil should feel dry before you give the plant more water. A spider plant grows well in almost any kind of light. Keep it in a warm place, too. If you follow these tips, you will likely have a wonderful houseplant to enjoy for a long time.

Flower Parts

Many people enjoy flowers in outdoor gardens and in vases in their homes. But flowers are not just for us to enjoy. They have a job to do. Flowers make seeds for the plant. When the seeds are released, they grow into new plants.

While there are many different kinds of flowers, they all have some parts in common. Most flowers have petals. Petals are the colorful parts we admire. Petals attract insects to the flower. Insects follow the petals to get nectar. Nectar is a rich food for the insects. The nectar is at the bottom of the petals.

When an insect on the petals to get nectar, it also touches the stamens. These flower parts stick up inside the flower. Their tips are usually yellow and have pollen on them. As the insect gets nectar, pollen sticks to its body. When the insect goes to another flower for more nectar, it takes the pollen with it.

At the other flower, the insect will land on the petals. Some of the pollen it carries will come off on the other flower. Now this flower will begin to make seeds. The seeds will one day grow more plants that will make more flowers. Through this process, flowers will continue to grow and bloom.

Wind Power

The wind is a source of power. It helps kites to fly, and boats to sail. In some places, wind power is used to make electricity. People are working to find ways to help us get more power from the wind.

There are many reasons why turning wind into power can be a good idea. We will never run out of wind. It will always blow. Most other ways to make power use resources that could run out. Coal and natural gas are two common examples. One day, we might run out of them. We can count on the wind because it will always blow.

Windmills are what help us turn wind into electricity. When the wind blows, it turns the blades on the mill. This spinning makes a small amount of electricity. When you put a lot of windmills together, you can make enough power for a lot of people.

There are a few problems with wind power. Some days there is not much wind and you may flip a light switch and have no lights. Also, wind power cost more than other kinds of power. People are working to fix these problems. One day, when you turn on your bedroom light, your lamp may light up due to power from the wind.

Bats Are Not Birds

What has wings and can fly? If you said a bird, you are correct, but another correct answer is a bat. Bats and birds are both animals that have wings and can fly. While they have some things in common, they are also different in many ways.

Birds have feathers and lay eggs in a nest. The baby birds hatch from the eggs. Bats do not have feathers and do not lay eggs. They are mammals. Like other mammals, bats have fur on their bodies. The baby bats drink milk from their mothers. They do not live in a nest, but in caves and trees.

If you were to look at the bones of a bat and a bird, you would notice differences. A bat's bones look like the bones in your arm and hand. The bones look like long fingers. Instead of feathers, a thin skin covers the bones. A bird's bones are shorter. They are covered and supported by the feathers. You can see another difference between bats and birds when you look at their mouths. Most bats have teeth to chew insects or fruit. Birds have bills. Their bills have different shapes depending on what they eat.

The next time you see something flying, ask yourself, "Is this a bat or a bird?" Remember they are not the same!

Amazing Dolphins

Can you jump as high as a house? Could you win a race with a shark? Could you find a quarter on the playground with your eyes closed? You could do all these things if you were a dolphin!

A dolphin has a very strong tail that helps it jump high in the air. A dolphin's tail muscles are much stronger than the muscles of other mammals. A dolphin pumps its tail up and down to propel itself through the water. A dolphin can swim so fast that one flick of its tail sends the dolphin sailing into the air. Jumping out of the water is one way the dolphin gets air while swimming. Dolphins do not always swim at top speed, but they are always ready to go fast if an enemy comes near. Dolphins often swim together in a group. They warn each other if they see a shark. When escaping a shark, dolphins can swim as fast as some speedboats!

One of the most interesting things about a dolphin's body is the way it finds things. A dolphin makes clicking sounds that bounce off objects in the sea. When the clicking sounds bounce, they make echoes that the dolphin can hear. The sound of the echoes tells the dolphin where the things are. Using clicks and echoes, a dolphin could find a quarter that was a half a block away! The clicks and echoes are important because they help the dolphin find food. The sounds also help dolphins stay away from enemies.

When you hear a dolphin jumping, swimming, and making noises, you'll know it is not just playing. It's using its body to stay safe and healthy!

Appendix D Social Validity Survey

CURP Survey

The purpose of this survey is to gather feedback on what you thought about the TWA intervention. This survey is anonymous. Please be honest with your response.

Read each statement below. Decide if you totally disagree (1), kind of disagree (2), kind of agree (3), and totally agree (4) and circle the corresponding number.

	I totally disagree	I kind of disagree	I kind of agree	I totally agree
1. The TWA strategy was too much work for me.	1	2	3	4
2. I understand why Ms. Sara picked the TWA strategy to help me read better.	1	2	3	4
3. I could see myself using the TWA strategy again.	1	2	3	4
4. The TWA strategy is a good way to help students.	1	2	3	4
5. I clearly understood what I needed to do with the TWA strategy.	1	2	3	4
6. I would want to try the TWA strategy again.	1	2	3	4
7. The TWA strategy took too long to do.	1	2	3	4
8. If my friend was having trouble reading, I would tell him/her to try this.	1	2	3	4
9. I was able to do every step of the TWA strategy.	1	2	3	4

10. I felt like I had to use the TWA strategy too often.	1	2	3	4
11. If I used the TWA strategy in class it would take up too much time.	1	2	3	4
12. There are too many steps to remember in the TWA strategy.	1	2	3	4
13. Using the TWA strategy in class would get in the way of other things.	1	2	3	4
14. I understand why I need to improve my reading comprehension.	1	2	3	4
15. Using the TWA strategy in class would focus too much attention on me.	1	2	3	4
16. I was excited to try the TWA strategy in the beginning.	1	2	3	4
17. Using the TWA strategy would make it hard for others students to work in the classroom.	1	2	3	4
18. I would volunteer to use the TWA strategy again.	1	2	3	4
19. It was clear what Ms. Sara was expected to do when teaching the TWA strategy.	1	2	3	4
20. I was able to use the TWA strategy correctly.	1	2	3	4
21. I liked the TWA strategy.	1	2	3	4

Any other comments about the TWA strategy:
