5-2019

Efficacy of Self-regulation Strategy on Reading Comprehension Development for Students with Reading Difficulties

JIN HEE CHAE
Saint Cloud State University, chjinhee@gmail.com

Efficacy of Self-regulation Strategy on Reading Comprehension Development for Students with Reading Difficulties

by

Jin Hee Chae

A Starred Paper

Submitted to the Graduate Faculty of

St. Cloud State University

in Partial Fulfillment of the Requirements

for the Degree of

Master of Science in

in Special Education

May, 2019

Starred Paper Committee:
Kyounghee Seo, Chairperson
Bradley Kaffar
James Robinson

Table of Contents

Chapter Page

List of Tables

Table Page

Chapter I: Introduction

Reading comprehension is a key competency for successful learners, not only for their school years but throughout their lives (Crabtree, Alber-Morgan, & Konrad, 2010). About 5-18% of the student population in general education demonstrates a severe reading disability (Zentall & Lee, 2012). In 2000, The Report of the National Reading Panel identified five essential reading components including lower-order skills such as phonemic awareness, phonics, and reading fluency and higher-order skills such as vocabulary and comprehension. A higher-level of cognitive activity in reading such as reading comprehension is associated with proficiency in the implementation of strategies for improving the higher-order skills (Therrien, Wickstrom, & Jones, 2006). Explicit implementation of comprehension strategies is effective for reading comprehension development of students with reading deficits (Manset-Williamson, Dunn, Hinshaw, & Nelson, 2008). McCollin and O'Shea (2006) asserted that special education overidentification can be reduced by providing a strong literacy foundation through intensive reading instruction. Therefore, all learners with reading disabilities require targeted, research-based strategies to increase reading achievement (Edmonds et al., 2009).

Reading is a complex activity that involves both the automatic process and strategic cognition to comprehend texts (Tankersley, 2005). However, students with reading difficulties face difficulty in flexibly using strategies, while competent readers can self-regulate comprehension (Minguela, Solé, & Pieschl, 2015). In other words, students' abilities to independently self-regulate their reading affect their reading comprehension proficiency (Roberts, Torgesen, Boardman, & Scammacca, 2008). The purpose of this study is to examine the effectiveness of self-regulation strategy embedded in reading comprehension strategy

intervention for students with reading difficulties. This study investigated the role of self-regulation in reading comprehension intervention by exploring the relations between monitoring, motivation, self-efficacy, and performance in reading comprehension treatment for struggling readers. Therefore, the unique contribution of this study lies in identifying the role of, as well as, the efficacy of self-regulation strategies in reading comprehension interventions.

Reading Difficulty (RD)

According to Vaughn, Mathes, Linan-Thompson, and Francis (2005), one in five students have difficulties in reading and students who are not reading at grade level by the third grade are more likely to be at a significantly higher risk for dropping out of high school before graduation. Moreover, students with reading difficulties are highly likely to struggle in their adult lives with issues such as unemployment or underemployment, limited access to various resources, lack of motivation to succeed, and limited social interaction. The impact of literacy on school and later life success suggest that schools should focus on intensive intervention and preventative efforts to teach students who have reading difficulties (National Joint Committee on Learning Disabilities, 2008).

In an effort to enhance reading skills and narrow the literacy gap, the Individuals with Disabilities Education Act (IDEA) of 2004 encourages schools to use the Response-to-Intervention (RtI) to ensure early screen and instructional support for literacy development of students. Response-to-Intervention frameworks have been prevalently utilized in schools as academic and behavioral prevention and intervention organizational approach to support curricular and instructional decisions (Mellard, McKnight, & Jordan, 2010). School-wide RTI models of early reading intervention facilitate two roles as a universal screening for identifying

struggling readers early in school and as a strategy of providing research-based reading intervention without delays even before formal evaluation before determining eligibility for special education (O'Connor, Bocian, Beach, Sanchez, & Flynn, 2013).

Edmonds et al. (2009) conducted a synthesis of intervention studies between 1994 and 2004 with adolescent readers from Grades6-12 with reading difficulties. Thirteen out of 20 studies showed an effect size (ES) of 0.89 in comprehension outcomes between the intervention group and comparison groups. On the other hand, the effect size of word-level interventions scored 0.34 in comprehension outcomes between the intervention group and the comparison group. Results from this meta-analysis indicate that students with reading difficulties and disabilities can improve their comprehension when provided with a targeted reading comprehension intervention.

Reading Comprehension

The Report of the National Reading Panel (National Reading Panel, 2000) identified five essential reading components including lower order skills such as phonemic awareness, phonics, and reading fluency and higher order skills such as vocabulary and comprehension. Reading competence begins with effective research-based instruction including critical skills: (a) phonological awareness, or the ability to hear, identify, and manipulate individual sounds in spoken words; (b) alphabetic understanding, or understanding letter-sound correspondence; (c) accuracy and fluency, or constructing seemingly effortless word recognition; and (d) reading comprehension, or using experiences and knowledge of language construction along the process of analyzing, make sense of, and text-to-self connection to what they read (National Reading Panel, 2000).

According to the National Reading Panel (2000), reading comprehension is the ability to simultaneously extract and construct meaning from what they read and understand information. Proficient readers apply their experiences and prior knowledge of the world into the text to interpret messages and information from authors with their understanding of language structure and knowledge of reading strategies (Nelson & Manset-Williamson, 2006). Many who are unable to read comprehensively tend to focus on word recognition rather than on contextual meaning without self-monitoring as they read (Manset-Williamson et al., 2008). A key to improve reading comprehension is using carefully selected materials at their instructional level that facilitate comprehension (Edmonds et al., 2009).

Self-Regulated Learning (SRL)

Souvignier and Mokhlesgerami (2006) stated that the self-regulated learning model might be "a powerful framework to optimize effects on reading comprehension" (p. 57). Self-regulation refers to processes and components involving students' abilities to control and maintain cognitions, emotions, and behavior in the pursuit of long-term goals (Berkeley & Larsen, 2018). Zimmerman and Schunk (2001) defined self-regulation as a process that learners employ to display personal initiative, perseverance, and adaptive skill in pursuing it. Zimmerman (2008) conceptualized the self-regulation process as the development of metacognitive, motivational, and behavioral construct. In addition, students' self-belief includes related factors such as self-concept, self-efficacy and causal attribution (Berkeley, Mastropieri, & Scruggs, 2011; Chapman & Tunmer, 2003; Toste, Capin, & Vaughn, 2017). These variables are important to motivational beliefs such as motivational cognition, metacognition, and learning (Bandura, 1986).

Zimmerman and Schunk (2001) discussed the importance of self-regulated learning (SRL) in academic achievement and proposed theoretical frameworks for SRL. Furthermore, Massey (2009) pointed out that theoretical frameworks for self-regulation in reading are based on a large extent on research on the use of metacognition and self-regulation strategy in SRL models. Self-regulated learners utilize the self-directive process to transform their cognitive abilities into task-related academic skills (Zimmerman & Schunk, 2001). Zimmerman (2008) defined characteristics of self-regulate learners as goal-directed, strategic behaviors, and performer of high levels of self-awareness, self-reflection, and adaptive thinking.

Berkeley and Larsen (2018) described following six self-regulation strategy components below. Cognitive modeling of the strategy can include teacher modeling how/why/why to use the strategy. Goal setting could include goals to use strategies or to comprehend the content. Self-monitoring of the strategy use by utilizing checklists and visual cue cards. Comprehension monitoring included students self-checking or self-evaluating their understanding. Attribution training and strategy value feedback included encouragement for students to attribute successful performance to their effort and strategy use.

Research Question

This review of the literature explores one research question: What self-regulation strategy in reading comprehension is effective for students with reading difficulties in upper elementary and secondary setting?

Focus of the Paper

This review of the literature examines the outcomes of literacy interventions for students with RD in upper elementary and secondary setting in the United States. Studies were included

in Chapter II if participants were identified as reading difficulties with and without learning disability. Mixed samples such as other health impairment (OHI), Attention Deficit/Hyperactivity Disorder (ADHD), and other mild disabilities were included. Studies were also included if students were identified as English language learners who continued to struggle with reading despite the bilingual services they received. To be included, the study intervention needed to be designed to teach reading comprehension strategies and contain at least one SRL components. Additionally, at least one reading comprehension outcome measure was required.

Following search procedures, a total of 11 studies had been selected. Those 11 studies were conducted between 2006 and 2018 and targeted students in Grades 4-12 including postsecondary students with severe reading difficulties in one study (Hua et al., 2008). In the Chapter II review of literature, both reading comprehension components and self-regulation components in research-based studies were reviewed and analyzed.

These studies were located using PsycINFO, Academic Search Premier, ERIC, and ProQuest Dissertation. I used various keywords and keyword combinations to locate appropriate studies: *attribution training, goal setting, learning disabilities, reading comprehension, reading difficulty, and self-monitoring*. To locate more current studies on the topic, I also conducted a search of the table of contents of three journals. Specifically, I reviewed several issues of *Education and Treatment of Children, Journal of Learning Disabilities, Learning Disability Quarterly, Learning Disabilities Research and Practice, and Remedial and Special Education.*

Importance of the Topic

As a special education teacher in elementary school, I have an opportunity to work with individuals with a wide range of age groups and various level of students with reading

difficulties. Unfortunately, I observed how often students' inabilities to understand subject areas influence their success in all subject areas of academic achievement. I strongly believe that effective reading teachers are flexible and understand the source of students' difficulties and needs. To enhance reading skills and narrow the literacy gap, I felt the need for studying and analyzing research-based interventions to implement them to improve my instructions to be more effective.

Furthermore, I noticed students still struggled in answering reading comprehension questions even after completing reading comprehension strategy intervention. I realized that students were not ready to utilize the strategies independently until they reach automaticity through self-regulation. Teaching how to self-regulate their learning has a positive impact on students' reading comprehension which affects student success in academic achievement (Roberts et al., 2008). Many students struggle in school because of their inability to manage and control their learned skills and strategies, and I believe self-regulation intervention can facilitate their motivation, strategic behaviors, and metacognitive skills (Vaughn, Gersten, & Chard, 2000). Ultimately, this paper will improve my instruction to be more explicit and systematic in order to enhance reading skills and narrow the literacy gap for students with reading difficulties.

Definitions

Attention Deficit/Hyperactivity Disorder (ADHD) is a brain disorder which "affects inattention and/or hyperactivity-impulsivity that interferes with the quality of how they function socially, at school, or in a job" (National Institute of Mental Health, 2016, ¶ 1).

Attribution retraining is a technique to motivate learners by changing their beliefs towards successes and failures on their performance to enhance achievement (Berkeley, Mastropieri, & Scruggs, 2011).

Direct instruction emphasizes learning by explicit teacher modeling embedded in well-planned and teacher-centered instruction (Rittle-Johnson, 2006).

Expository texts are materials written to deliver information rather than entertain readers to learn something new such as textbooks and newspapers (Hebert, Bohaty, Nelson, & Lambert, 2018).

Fusion reading is funded by Striving Readers, which is funded by the United State Department of Education to implement research-based strategies to increase adolescent literacy levels (Schiller et al., 2012). Fusion Reading is designed to narrow the reading comprehension achievement gap for students in the secondary setting as a two-year program (Hock, Brasseur-Hock, Hock, & Duvel, 2017).

Fluency refers to the ability to read the text "accurately, quickly, and with expression" (Manset-Williams & Nelson, 2005). It requires a multifaceted process involving readers to recognize the words automatically and construct meaning efficiently (Manset-Williams & Nelson, 2005).

Guided practice is a part of instruction involving interactions between teacher and students. Students and teachers work together to complete the take after explicit modeling demonstrated by the teacher (Numrich & Kennedy, 2017).

Independent practice is a part of the lesson, coming after teacher model and guided practice as a final phase of the learning process. Students are given opportunities to produce

work by themselves without teachers' guidance or modeling (Afflerbach, Pearson, & Paris, 2008).

Inferential-making is the process of the readers reaching a conclusion or achieving a new understanding by putting together their background knowledge and information they learned from the text when the information is not directly stated in text (Reed & Lynn, 2016).

Intellectual disabilities (ID) is a disability in "intellectual functioning and in adaptive behavior which affects conceptual skills, social skills, and practical skills" (American Association on Intellectual and Developmental Disabilities, 2010).

Intervention refers to a carefully designed instructional plan implemented in the pursuit of enhance performance of someone in need of change to the desired level of progress (Midgley, 2000).

Learning Disability (LD) is a neurological condition that results in "processing problems which interfere with learning basic academic skills such as reading, writing, and/or math and higher level skills such as organization, time planning, abstract reasoning, long or short term memory and attention" (Learning Disabilities Association of America, 2015, ¶ 1).

Metacognition refers to a higher order thinking skill that evaluates and monitors one's own thought process on task performance and their learning (Coutinho, 2007).

Motivational beliefs are internal forces to direct themselves to positive thoughts and give themselves encouragement to be focused or goal-oriented and, eventually, to reach a desirable level of achievement (Toste et al., 2017).

The narrative text is stories written to entertain; the most common elements found in narrative texts are "characters with goals and motives, event sequences, and morals and themes"

(Sáenz & Fuchs, 2002). The narrative text includes a material based on fictional setting or actual events described based on the narrator's subjective perspective (Soto, Solomon-Rice, & Caputo, 2009).

Other Health Impairment (OHI) refers to a range of conditions broadening educational challenges due to limited strength, vitality, or alertness which results in limited alertness in the educational environment (Special Education Guide, 2013).

Repeated reading is a reading method to monitor students' oral reading fluency development (Staubitz, Cartledge, Yurick, & Lo, 2005). Repeated reading is an instructional practice to read a short and meaningful passage over and over again until students achieve the desired reading rate (Therrien et al., 2006).

Self-efficacy is one's beliefs that one can succeed in specific situations or accomplish a task (Berkeley, Mastropieri, & Scruggs, 2011).

Chapter II: Review of Literature

According to the National Assessment of Educational Progress (NAEP) at Grades 4-8 reported by the National Center for Education Statics (NCES, 2015), 66% of fourth-grade students and 70% of eighth-grade students demonstrated reading proficiency below the benchmarks. Furthermore, over 30% of fourth-grade students and 24% of eighth-grade students read even below the fundamental level. The need of paying particular attention to research-based interventions to improve literacy skills for struggling adolescent readers is greater than ever (Schiller et al., 2012). The purpose of this literature review is to determine what self-regulation strategies resulted in positive outcomes in the reading comprehension skills of adolescent readers. This review is presented in ascending chronological order and includes a total of 11 studies.

Reading Comprehension Interventions Containing Self-Regulation Strategies

Berkeley, Mastropieri, and Scruggs (2011) conducted a four-week long study in addition to six-week delayed posttest to examine the effectiveness of reading comprehension strategy (RCS) instruction with and without attribution retraining (AR). The intervention implemented with students in seventh, eighth, and ninth grades who were randomly assigned to one of three conditions: RCS+AR, RCS, or a Read Naturally (NR). Fifty-nine students with mild learning disabilities who received special education service were selected from a middle and high school in a metropolitan area on the east coast United States. Participants included 20 students in comprehension strategy instruction with attribution retraining treatment condition (RCS+AR), 19 students in RCS treatment only condition, and 20 students in Read Naturally (RN) treatment

condition. RCS+AR and RCS groups showed a significant main effect but RCS+AR students displayed the higher score and maintained the result six weeks after a delayed posttest.

Students in all three conditions received 12 sessions of instructions for 30 minutes each over a four-week period totaling 360 minutes of intervention. Each intervention contained 20 minutes of primary instruction (RCS or RN) and 10 minutes of supplemental instruction (AR or read aloud). Students in both RCS and RCS+AR conditions received instruction through teacher guided discussions to learn how and when to use reading comprehension strategies by following sequences: (a) teacher modeling, (b) guided practice, and (c) independent practice. Moreover, 10 minutes of AR instructions were provided prior to RCS intervention targeted to students in the RCS+AR condition for each session. Additionally, AR strategies included helping students identify positive thoughts and develop positive self-talk statements through simple/complex scenarios. Furthermore, the RN program required students to read with a teacher during a "cold timing" and to record their correct words per minute (CWPM). Then, students set a goal to improve their cold timing score and followed the process of: (a) making predictions, (b) repeated reading, and (c) answer comprehension questions. Finally, the student's "hot timing" was measured as CWPM and compared to "cold timing" score and graphed to show their reading fluency growth. For students in both the RCS and RN conditions, the teacher read aloud the high interest short stories for 10 minutes at the end of each session.

Comprehension summarization test and passage-specific content test were used to assess pre- and post-comprehension outcomes. The result of ANOVAs indicated that there were no significant differences were reported for pretest mean scores. The summary posttest data revealed that both instructional groups in treatment condition demonstrated larger effect sizes for

the RCS+AR (ES = 1.44) and RCS groups (ES = .94) than the NR group. The results represented that, although there was no significant difference shown between two treatment groups, both RCS+AR and RCS groups outperformed the comparison group, $F(16, 39) = .87$, $p = .60$ (respectively, $p = .000$ and $p = .005$). Consistent with results from posttest scores, the results from summary delayed posttest data which was measured six-weeks after the study completed remained statistically higher for instructional groups, $F(16,38) = .95$, $p = .53$. These findings represented a large effect size for RCS+AR condition (ES=1.21) and moderate effect size for RCS condition (ES=.71). The Passage-specific posttest data revealed no noteworthy difference for the condition group, $F(2, 39) = .12$, p=.89, and the instructional group, $F(16,39) =.5$, $p = .63$, as well as ANOVA score using Passage-specific delayed posttest data collected six-weeks after the posttest for the condition group, $F(2,38) = .53$, $p = .59$ and the instructional group, $F(16,39) =.5$, $p = .63$.

Berkeley, Marshak, Mastropieri, and Scruggs (2011) exhibited limitations of the current study due to the disproportionate number of RCS+AR groups and self-reporting measures. The researchers addressed the necessity of adding a measure of the strategy usage rather than relying on students' self-reporting and including self-efficacy and motivation as factors impact students' learning. The current investigation revealed the benefits of reading comprehension strategies instructions and impacts on learning content and demonstrating higher level thinking about reading. Moreover, the evidence of strategy groups (with and without AR) which outperformed the comparison condition after a six-week delay supported the importance of direct instruction in reading comprehension strategies.

Berkeley and Riccomini (2011) designed a randomized pre-and post-experimental study to investigate the effectiveness of a comprehension monitoring strategy (QRAC-the Code) for improving reading comprehension. Students in sixth and seventh grades read the expository text in inclusive social studies classes with/without the comprehension monitoring strategy. Three hundred and nineteen students including 31 students who were identified for special education service (27 LD students and 4 OHI students) were chosen from a new midsize middle school in rural southeastern United States. One hundred and seventy-seven students in the experimental condition were selected as a comprehension monitoring group and 142 students in the comparison condition were selected as a monitored independent reading group.

In both the experimental and comparison condition, students participated in 20-minute daily instruction over a three-day period. The experimental group received instructions to utilize the comprehension monitoring strategy containing steps followed the mnemonic QRAC-the-Code: (a) Question (Turn headings into questions), (b) Read (Read the section and STOP), (c) Answer (Ask yourself: Can I answer my question?), and (d) Check (Check to be sure your answer was correct or summarize the section). The comparison group was requested to take notes on three important points after independently reading the unfamiliar material in the textbook. After three lessons, a 29-item content test assessing specific factual content and main ideas and strategy awareness survey measuring strategy awareness were given to the participants.

Pre- and post-data from content test and strategy awareness survey collected in this study were analyzed in two conditions (comprehension monitoring/monitored independent reading) and two programs (general education/special education). The results of ANOVAs with 24 instructional groups indicated statistically significant effects for the experimental group in the

treatment condition, $F(1,293) = 7.81$, $p = .006$. One hundred and fifteen (64.25%) out of 177 students who learned the QRAC-the-Code strategy stated that the comprehension monitoring strategy helped them remember what they had read. However, only 17 students (11.81%) of 142 students who independently read and took notes reported that notetaking helped them recall what they had read. In addition, both 81.05% of students of the comprehension monitoring group and 70.89% of students of the note-taking group reported after the study completed that using one or more strategies was effective while reading.

The results of this research revealed that the treatment group students with comprehension monitoring strategy significantly outperformed the comparison sample of students with notetaking at the posttest, $t(317) = 7.44$, $p < .00$. Furthermore, one of Berkeley and Riccomini's (2011) findings was that students with disabilities exhibited the moderate effect size (ES = 0.73), comparing to the effect size of students in general education (ES = 0.47). Another finding of the current research was that even over a short period of time, students who learned the QRAC-the Code strategy in a whole-class setting identified more reading comprehension strategies while reading even after instructions than students in the note-taking group did. It is noteworthy that students, especially students in special education service, demonstrated statistically significant gains from QRAC-the Code strategy and merely few students recognized note taking, the most ordinary strategy in general education class, as effective.

There are concerns and suggestions for future research. The current study was targeted for the effectiveness of the strategy. Therefore, future study should explore teachers' usage of strategies as well as professional development. Moreover, since materials and subjects were limited to an expository text from a single history textbook, the future study should consider

including different subject areas and materials to address transferability and effectiveness of the QRAC-the-Code strategy on a different function of the text. Lastly, maintenance of the ability to use the strategy should be investigated and included within the future research, especially for students in learning disabilities.

Crabtree et al. (2010) examined a functional relation between the self-monitoring intervention and active responding on the reading comprehension. Three high school seniors diagnosed with learning disabilities and significant attention problems such as AD/HD were monitored. Andy, Robert, and Troy, age 17 to 18, from a suburban public high school participated in this study. Participants were receiving special education service as the part of their school day and their reading achievement scores in reading comprehension were at least one standard deviation below mean. Materials included short fiction stories, self-monitoring response sheets, immediate recall worksheet, and quizzes. The researcher provided 15- to 30-minute sessions each time and collected data three times a week, Monday through Wednesday, in the special education resource room.

During intervention session, one teacher as a scorer supported other six students with independent projects while the experimenter as a first author worked with three students. For "baselines," the experimenter provided a story with a story fact sheet and collected data from a 10 short answer reading comprehension quiz. During "training" sessions, the experimenter provided instructions, modeling, and guided practice to complete the response sheets after reading a one-page fiction story with three stopping points. The response sheets included five questions asking the main characters, setting, problem, ending, and solution. Although the participants took a 10-item quiz, no data were collected during the training sessions until the self-

monitoring phase. During “the self-monitoring” intervention condition, the participants completed the response sheet and a 10-item short answer reading comprehension quiz throughout the “maintenance” condition. After a minimum of five self-monitoring sessions until reaching 80% of quiz accuracy on three consecutive sessions, the participants received modified response sheets with abbreviated prompts, for example ‘S1’ instead of ‘Stop 1.’ Additionally, the embedded prompts on three stopping points were removed to encourage the participants to be independent on the self-monitoring procedure.

Immediate recall accuracy and quiz accuracy as well as social validity questionnaire were administrated to measure the effectiveness of the intervention. All three participants scored a range of one to five out of 20 possible on “immediate recall responses” during baseline. After the implementation of the intervention, Andy’s responses ranged from 9 to 17 with a mean of 13, Robert’s ranged from 8 to 14 with a mean of 10.7, and Troy’s ranged from 0 to 13 with a mean of 10.4. During maintenance, all three participants demonstrated increased results ranging from a mean of 13.0 to 14.8. For “quiz accuracy,” all three participants’ scores ranged from 0 to 60% during baseline. During the intervention, Andy’s quiz scores ranged from 70 to 100% with a mean of 83%, Robert’s ranged from 60 to 100% with a mean of 82%, and Troy’s ranged from 80 to 100% with a mean of 86%. All participants scored at least 80% during a maintenance condition. Andy’s maintenance quiz scores were 100% on four out of five sessions. One week after data collection, the participants completed “the social validity questionnaire” to determine their opinions about the self-monitoring intervention. The results indicated participants’ positive experience of the experiment and beliefs of the benefits of the strategy.

The results of this study revealed a functional relation between the self-monitoring intervention and reading comprehension of high school students with reading difficulties. Three participants who demonstrated 0 to 60% accuracy on the reading comprehension quiz prior to the intervention improved their accuracy ranging from 70 to 100% after the intervention. Furthermore, they were able to maintain their performance on reading accuracy at or above their intervention levels without embedded prompts.

Crabtree et al. (2010) proposed a few suggestions for the future study and implications for practice. The researchers suggested other instructional arrangements such as small groups or peer-tutoring and longer reading materials in different formats, instead of one-on-one teaching arrangement using a limited short fiction story. Moreover, a longer maintenance phase would allow further investigations for more independent and generalized usage of the self-monitor strategy. Educators can individualize the response sheets by modifying or simplifying them to be appropriate for students' level of functioning. In addition, teachers can provide high interest reading materials and reading choices for implementing the structured self-monitoring intervention for students struggling with motivation.

Fagella-Luby, Schumacher, and Deshler (2007) investigated the effectiveness of the implementation of Embedded Story Structure (ESS) routine in literature class compared to the alternative condition called comprehension skills instruction (CSI). Among 79 ninth-grade students, which included 14 students with LD, 39 students were randomly assigned to the ESS routine group and 40 students to the CSI group. Participants attending a private urban high school in the southeastern United States were instructed over a nine-day period during a summer

school program. Each time, 12 to 14 students in general education literature classes were taught by the same teacher who is also the primary researcher.

Students who demonstrated limited reading comprehension received 90 minutes of instructions on days one and nine and 120 minutes of instructions on Days 2 through 8, for a total of 17 hours of instruction. Eight short stories and a folktale were utilized as reading materials during instructions. The ESS instruction targeted three strategies: (a) self-questioning, (b) story-structure analysis, and (c) summary writing. Before reading, students utilized the self-questioning strategy including seven individual question words (who, what, when, where, which, how, and why) and answered on the ESS graphic organizer. During the reading, students made story-structure analysis by labeling specific events from the text on a Story-Structure Diagram. After reading, students summarized the story based on their answers and story structure analysis on the ESS organizer. The CSI group used three research-based strategies: (a) the LINCS Vocabulary Strategy, (b) Question-Answer Relationship (QAR), and (c) semantic summary mapping. Before reading, students utilized a vocabulary strategy called LINCS by using mnemonic strategies to link known information to definitions of new words. During the reading, students asked and answered text-based and knowledge-based questions for the QAR strategy. After reading, students organized critical components of the story into a connective semantic/concept map on the CSI organizer.

ANOVAs and *t*-test on a strategy-use test, knowledge test, unit reading comprehension test, and reading satisfaction survey were administrated before and after interventions. The result of these data indicated that students in the ESS routine statistically significantly outperformed students in the CSI groups in strategy use, $t\ (60.5) = -15.9$, $p < .001$, $d = .807$,

story-structure knowledge, t (77) = -4.11, $p < .05$, $d = .208$, and unit reading comprehension, t (54.4) = -15.3, $p < .001$, $d = .776$. These results represented a significant impact on the ESS routine, especially for the unit reading comprehension. Moreover, there was no significant difference between students with or without a disability who received the ESS instructions, as represented by large effect size. The results of the satisfaction survey collected at the end of the study demonstrated that students expressed their satisfaction with their growth in reading abilities.

For future research, Fagella-Luby et al. (2007) suggested having the teacher deliver the intervention, not the researcher. Additionally, the larger number of LD students should be involved in this study along with standardized reading comprehension measures to examine the development of successful pedagogy in the field of study.

Hua et al. (2018) conducted research investigating the effects of the Reread-Adapt and Answer-Comprehend (RAAC) with goal setting intervention for postsecondary learners with Intellectual disabilities (ID), from age 19 to 20. Five participants were enrolled in a post-secondary education (PSE) program, including four students with learning and cognitive disabilities who have a sixth-grade instructional reading level and one student with Down Syndrome who has first grade independent reading level. Two instructors with five years of special education experience delivered the interventions as well as administrated baseline and post-test in this study.

The study took place at a Midwestern university and used AIMSweb passages for oral reading fluency (ORF) and reading comprehension and RAAC reading passages for the intervention materials. During baseline, the instructor measured students' correct word per

minute (CWPM), and their oral retell without looking at the passage at the end of one minute. For RAAC intervention, a cue card with questions asking key structures of the content was provided. While students read a RAAC reading passage three times, interventionists explicitly taught students to correct the mistakes by modeling. After reading, students orally answered the questions on the cue cards and the instructor prompted correct answers for the incorrect response. During the intervention, students set a reading goal based on their current ORF score and received feedback after their CWPM was graphed.

Hua et al. (2018) conducted three visual analysis on CWPM, the total number of decoding errors per minute (DEPM), and index of narrative complexity (INC) of oral retell across the participants. The results of the analysis of the decoding and comprehension measure were inconsistent and did not show a functional relationship between the intervention and the participants' performance on decoding and comprehension. The visual analysis revealed that the current study was failed to reject the null hypothesis of no effects of the intervention ($\alpha = 0.05$, $\rho = 0.1$). The results of this research indicated that the generalization in reading comprehension for young adults with LD could not be achieved by the RAAC with goal setting intervention.

The findings of this study suggested that future research should plan more intensive and systematical interventions by utilizing response-guided and randomized single-case research design to enhance valid inference. Hue et al. (2018) recommended Self-Determined Learning Model of Instruction (SDLMI) proposed by Wehmeyer, Palmer, Agran, Mithaug, and Martin (2000) which promotes students to take ownership in their learning and be a problem solver instead of teacher-directed learning model used in this study.

Reed and Lynn (2016) investigated the effectiveness of an inference making strategy taught with and without goal setting as a self-regulation skill. The participants for this study included 24 students in grade five to eight with disabilities from two different places in the southeastern United States. Sixteen students with disabilities, primarily LD from public middle school (School A) and eight students reading below grade level from a juvenile correctional facility (School B) were selected. A graduate assistant with two years of special education teaching experience for each school implemented interventions.

Interventions were randomly assigned to the three treatment conditions: inference instruction only (IO), inference + individual goal setting (IIG), and inference + group goal setting (IGG). The seven sessions were conducted once or twice a week for seven weeks for IO and IIG groups and for five weeks for IGG group. The instruction review took three to five minutes and an average of 30 to 40 minutes were spent for inference making strategy instructions. The review of goals for the IIG and IGG groups required an average of two minutes per session.

During interventions, the students of inference only (IO) group started with defining '*inference*' with the teacher and the teacher introduced the graphic organizer. After review and practice in Session 2, students started to independently generate inference periodically in Session 3. Students worked in pairs during Sessions 4 and 5 and, finally, completed the graphic organizer independently. The differences of the IIG and the IGG groups from the IO group are that, in Session 2 students set a goal for the number of inferences to make and developed three steps to achieve that goal using the goal setting form. Students recorded the progress on the goal chart and adjusted their goals after two consecutive sessions.

The *easyCBM multiple-choice reading comprehension measure* (Alonzo, Tindal, Ulmer, & Glasgow, 2006) was administrated before and after the interventions to examine their reading performance. Students read a sixth-grade level passage and answered 20 multiple-choice questions including literal, inference, and evaluation items. The number of inference made and attempted was recorded to determine whether students reached their goals. There were no statistically significant differences between treatment groups on the pretest and the number of attempted or valid inferences in Session 2. The IO group exhibited steady progress in the number of valid inferences from an average of 2.14 inferences in Session 2 to 4.25 inferences in Session 7. The performance of the IIG group declined from 2.57 in Session 2 and 2.50 in Session 3 and from 3.17 in Session 5 to 2.86 in Session 6. The students in the IGG group demonstrated statistically significant differences in the number of valid inferences from 2.57 in Session 2 to 10.29 in Session 3.

Overall, the importance of the result is that all treatment groups demonstrated improvement. Despite the lack of importance of overall posttest scores, the within-group gains on the overall comprehension score were substantial, IO: $t(8) = 2.76$, $p = .025$; IIG: $t(6) = 3.97$, $p = .007$; IGG $t(7) = 4.35$, $p = .003$. At pretest, the targeted students in treatment groups were overall considered a failing grade (57% correct responses) and, after five to seven weeks of interventions, they were considered a passing grade (71% correct) at posttest. While the strategy was modeled and practiced as guided by the interventionist in a whole group, students were more independent on making inferences during Session 3 and throughout the treatment. It is an important finding of the study that those substantial differences were made once goal setting was embedded as a self-regulation strategy.

Especially, the IGG group significantly better performed both the IO and IIG groups, $\chi 2$ (2) ranged from 11.06 to 15.53 and $p < .001$ to $p = .004$. For the most part, students in the IGG group exhibited the highest number of valid inferences comparing to other groups throughout the interventions; $\chi 2(2)$ ranged from 7.26 to 16.16 and $p < .001$ to $p < .05$. The IGG group maintained the highest numbers of valid inferences among the treatment groups even when their performance fluctuated from an average of 6.75 to 9.88 inferences between Session 4 and Session 7 (8.00 inferences). Furthermore, data on goal attainment of the IIG and IGG groups for Session 3 throughout the intervention, 75-100% of students in IGG group met their group goal in each session while from 0-57% of the students in IIG group met their individual goals. This finding indicated that inference making instructions with goal setting procedure significantly more effective than treatment without goal setting. Moreover, setting a goal as a group was statistically substantially beneficial than setting a goal as an individual for encouraging practice and self-reflection on students' efforts and progress. It is noteworthy that students made noticeable progress through interventions, especially with only two minutes of the group goal setting.

Researchers targeted the limited sample size of the treatment based on unique settings. Future study should consider a larger population of students for generalization of the result of the study. In addition, the fact that the fewer number of students the juvenile justice facility (School B) was identified with disabilities than the number of students in the public school (School A) lead to concerns about the under-identification of disabilities for underprivileged groups. Because of the possibility of teacher effects and some variability in students' performance from pre- to posttest, the findings of the study should be interpreted with caution.

Rouse and Alber-Morgan (2014) conducted a study to investigate the effectiveness of self-questioning strategy to improve students' reading comprehension. In this study, two fifth graders identified with LD received one-on-one interventions using prompt fading procedures to generate and answer questions independently. Thirty minutes of one-on-one intervention took place in the special education resource classroom two to three days each week.

The participants in this current research were two 11-year-old fifth graders receiving special education service from a rural public elementary school in the Midwest. Andrina and Cecil are both from a culturally and linguistically diverse background. Two students exhibited significant deficits in reading comprehension and displayed a second-grade instructional reading level. Expository reading passages adapted from Readworks.org were selected based on Flesch Kinkaid reading levels of 2.1 to 2.9. Data was collected by the primary data collector, a doctoral student with 10 years of teaching experience, and two secondary data collectors, doctoral students in a special education program.

This self-questioning intervention was designed as seven phases including baseline, embedded questions training, embedded questions, self-questioning training, self-question, self-questioning fading, and maintenance/generalization. Multiple baselines across participants were collected as students' reading and answering comprehension questions what they read. During embedded questions training, the participants practiced to stop at each of the four embedded questions, to underline the answer in the paragraph, and to write the answer to the question. After the instruction, participants completed the comprehension quizzes independently and received feedback. During embedded questions training, the participants practiced answering the question with the teacher's modeling and assistance. After the instruction, participants

completed the comprehension quizzes independently and received feedback. As embedded questions are replaced with a blank line to write the answer one at a time, students were trained to generate and answer explicit questions. The participants followed a "think-aloud" modeling process during self-questioning training: (a) underline an important or interesting fact, (b) formulate a question using a question word, (c) write the question, and (d) write the answer. As the four self-questioning (SQ) prompts were faded, a small picture of a stop sign was used as prompt for the participants to verbally generate and answer questions. During maintenance, three weeks after SQ fading phase, and generalization, six weeks after SQ fading phase, probes were administered within the same sessions in the same way as baseline phase without prompts. The participants were instructed to mark stopping points between paragraphs using their own symbols to self-questions. The only difference between the two probes is that reading passages at students' actual grade level (Flesch-Kinkaid, 5.0 to 5.5) were utilized during the generalization phase.

Comprehension quizzes were administered at the end of each intervention session. The eight multiple-choice questions contained two main ideas, vocabulary, sequencing, overall concept, author's purpose, cause and effect, and conclusions based on Common Core State Standards for English Language Arts and Literacy. Table 1 represents reading comprehension quiz scores across all phases of the study for Andrina and Cecil.

Table 1

Mean Scores on Comprehension Quizzes in Each Phase

Student	Baseline	EQ Training	EQ	SQ Training	SQ	SQ Fading	Maintenance	Generalization
Andrina	2.5 (31%)	6.5 (81%)	5.8 (73%)	7.2 (90%)	6.8 (84%)	6.5 (81%)	8 (100%)	6.5 (81%)
Cecil	2.1 (26%)	5.5 (69%)	5.8 (73%)	6.8 (85%)	5.8 (73%)	5.3 (66%)	7 (88%)	4.5 (56%)

By the end of implementing the intervention, both students demonstrated an average of four (50%) more correct responses than baseline. It is noteworthy that the students maintained their gains and exhibited a level of generalization six weeks after the last intervention session. The positive results for the two fifth graders with LD indicate that acquiring self-questioning strategy benefits students' reading comprehension. Answering embedded questions may increase engagement and serve as a model for generating self-questions. Moreover, generating questions independently can help students to identify key information and connect it to their background knowledge. Ultimately, students were able to utilize reading comprehension strategy independently and efficiently in a wide range of contexts through the prompt fading procedure.

The authors addressed the limitations from including only one fade and using multiple baselines. The future study may target more than two students and include students in lower or higher grade levels. Additionally, the research suggested the use of comprehension assessment in depth, not limited to a multiple-choice test. Students' writing skill and quality of questions should be assessed prior to the intervention implement. Moreover, data from the generalization phase should be collected throughout all of the phases, not at the end of the study.

Self-questioning strategies can benefit students, especially students with learning disabilities to improve reading comprehension. The teacher can implement strategies with various types of text for different genres and customize instructions for students in different age groups and ability levels. Finally, the self-questioning intervention used in the study can be leveled with a variety of subject areas, in different environmental settings and instructional group settings.

Schiller et al. (2012) evaluated the effectiveness of one year of the Fusion Reading with motivation strategy implementation. Eight hundred and seventy-one students in Grades 6 through Grade 10 were screened for the study. This case facilitated a quasi-experimental design with matched groups of middle school students with reading disabilities who scored at least two years below grade level on standardized reading measurement. Struggling students in the intervention condition received the Fusion Reading intervention with motivation strategies as supplemental reading intervention, whereas students in the control condition engaged in nonliterary activities. Participants in both conditions attended in regular English language arts (ELA) at classes and seven teachers participated as interventionists.

In the study, Fusion Reading designed was explicitly implemented to increase adolescent literacy levels as a specific instructional routine and supported by motivation strategies including setting goals and highly engaging reading materials. Students in the intervention condition received a structured intervention with a scope and sequence within a framework. These frameworks focused on explicit comprehension, vocabulary, and motivation strategies including: paraphrasing, visual imagery, self-questioning, mnemonics, writing and error monitoring, and extending the time frame for one year in duration. Additionally, teachers provided scaffold

instruction, practice, feedback, and monitoring progress with ongoing formative assessments for one class period for five days a week with no more than 15 students per class.

Sight Word Efficiency (SWE) and Phonetic Decoding Efficiency (PDE) subtest in *Test of Word Reading Efficiency Second Edition* (TOWRE-2) (Torgesen, Wagner, & Rashotte, 2012) and passage comprehension and sentence comprehension subtests in *The Group Reading Assessment and Diagnostic Evaluation* (GRADE) (William, Cassidy, & Samuel, 2001) were administrated to measure reading achievement after intervention. The result revealed that experimental condition demonstrated significantly higher TOWRE SWE ($p < .05$, ES = 0.10) and GRADE sentence comprehension ($p < .05$, ES = 0.15) than comparison condition. There was no statically significant effect found in other student outcomes.

Findings from one year of implementation of Fusion Reading intervention indicated a strong effect on improving sight word efficiency and sentence comprehension skills. The results indicated that explicit instruction on vocabulary, paraphrasing, and word study strategies supported by motivation strategies such as goal setting can improve word reading outcomes of struggling readers in the secondary setting. However, findings showed small effect sizes for improving adolescent reading comprehension outcomes. Future research should be designed to investigate the effectiveness of two-year intervention as originally designed for struggling adolescents' reading comprehension outcomes.

Therrien et al. (2006) conducted a research to investigate the effectiveness of Reread-Adapt and Answer-Comprehend (RAAC) intervention which combined repeated reading and question generation treatment. Twenty-nine students in fourth, fifth, seventh, and eighth grades participated in this study had instructional reading levels at first, second, third, and fourth grade.

Of 29 participants, 15 students diagnosed as LD and received reading service and 14 students read at least two grade levels below current placement. Students read 50 passages written by six graduate assistants for 10 and 15 minutes per session over four months of the period.

The study took place in a rural school district located in Southwest Ohio. A total of 29 students including 15 treatment students (nine LD and six students at risk) and 14 control students (seven students with LD and seven students at risk) were selected for the study. Students received interventions in pullout setting by 13 special education teacher candidates. Teachers were trained to conduct the intervention through two three-hour teacher training sessions as using a laminated cue card. Then, the teacher prompted to practice intervention implementation until demonstrating mastery through mock intervention sessions. A total of 300 original passages were created in a length of 1 to 1.25 minutes with target students' reading speeds at the 50^{th} percentile for their instructional reading level (Flesch Kinkaid reading levels of 2.1 to 2.9). Each passage included a complete narrative and a wide range of topics and themes.

The RAAC intervention was designed to contain components of the repeated reading and question generation literature bases. Teacher cued the students and presented a cue card containing question generation prompts after reading. The students reread out loud the passage for two to four times until they achieved a pre-established number of CWPM. Prior to orally answering questions on the cue card with teacher's assistance, students received corrective feedback such as error correction. Finally, the teacher challenged them with factual and inferential comprehension question about the passage. As the session repeated, the teacher adjusted the difficulty of the reading material depending on the students' ability to reach the pre-established number of CWPM.

During intervention administration across the 50 narrative passages (at first through sixth grades based on Flesch-Kincaid reading level) created by six graduate assistants over a four-month period, students increased the independent reading level from an average of 2.07 to 2.4 grade level. Moreover, students read an average of 22.16 seconds faster than on the first readings. Throughout intervention, students demonstrated an average 95% accuracy on answering factual questions and 92% accuracy on responding inferential question. These outcomes revealed a statistically significant difference between the intervention condition and the control condition.

The Broad Reading scale of the *Woodcock-Johnson Achievement Test III* (WJ-III) (Woodcock, McGrew, & Mather, 2001) and *Dynamic Indicators of Basic Early Literacy Skills* (DIBELS) *Oral Reading Fluency* (ORF) (University of Oregon, 2005) were administrated as pretest and posttest measures. ORF was measured by corrected words per minute (CWPM). After the current study completed, students in the treatment group increased their CWPM by an average of 13.0 words while students in the control group increased CWPM by only an average of 2.28 words. The large effective size (ES = 0.89) of DIBELS Oral Reading Fluency results indicate statistically significant, F (1.27) = 5.70, p = 0.024. The WJ-III Broad Reading subtests revealed an average of 6.2 for the treatment group and 3.0 increase for the control group. Although this result of the current study (ES = 0.69) were not statistically significant, F (1.27) = 3.47, p = 0.073, improvement of the treatment group indicated that the RAAC intervention benefited to students' overall reading achievement.

The findings of this study demonstrated the importance of providing reading comprehension strategies through repeated reading to students with serious reading difficulties.

The RAAC intervention significantly improves students' reading achievement, especially the area of their reading speed accompanied by higher oral reading fluency and ability to answer inferential comprehension question on the passage through repeated reading. However, the current study had limitations on control group comparison and reading fluency measurements. Furthermore, the usage of question generation prompts was only assessed within the intervention. Therefore, question generation prompts outside of the intervention and/or without teacher's guidance should be assessed in the future study. In addition, inclusion of targeted students' group of below first grade and above fourth-grade students for a longer duration could be beneficial to investigate the impact of the intervention for the future research.

Toste et al. (2017) explored the effects of a multisyllabic word reading (MWR) intervention with and without a motivational beliefs (MB) training implemented with upper elementary students on the measures of reading and motivation. Fifty-nine participants were selected from two elementary schools in an urban area in the southwestern United States. Participants were screened by using the *Test of Word Reading Efficiency Second Edition* (TOWRE-2) (Torgesen et al., 2012). Those selected participants scored below the 37th percentile which identifies students having reading difficulties and needing instructional support such as Tier 2 intervention. The third- and fourth-grade students who performed the lowest reading skills were randomly assigned to one of three groups: MWR only, MWR with an MB training (MWR + MB), or comparison condition group. Participants included 18 students in MWR only group, 19 students in MWR+MB training group, and 22 comparison students in the control group. Four tutors administrated interventions this case study.

In both treatment condition, students received 40 minutes of intervention instruction in the small group of two or three students during the school day in a designated location. Each intervention took a place three times each week for eight consecutive weeks, a total of 24 sessions. Forty-minute instructions in treatment groups included 35 minutes of MWR instruction for both groups and five minutes of embedded MB training for the MWR + MB group instead of five minutes of math fact fluency practice for the MWR only group. MWR instruction starts with "Warm-up" by introducing a targeted vowel pattern in isolation and "Affix Bank" follow with new affix words. "Word Play" included practicing assemble read word pars automatically. Next, for "Beat the Clock," students repeatedly read multisyllabic words and move on to "Speedy read" by reading high-frequency multisyllabic words. Finally, during "Text Reading," students complete repeated reading of the connected text. MB training, students started each lesson by sharing their readiness on a scale from one to five using the "Check-in" poster. During sessions, students learned to identify negative thoughts and generate positive self-talk through scenarios and tutor modeling. As the treatment progressed, their real academic situations were discussed to recognize negative thoughts and develop self-motivated statements.

The Wide Range Achievement Test-Fourth Edition (WRAT4) (Wilkinson & Robertson, 2006) to assess text comprehension and the Reading Attribution Scale (RAS) (Berkeley, Marshak et al., 2011) to measure motivations were administrated for this study. The result showed that, on the sentence comprehension subtest of the WRAT4, the MWR + MB group significantly outperformed comparing to the MWR-only group ($\beta = 5.54$, $\rho = .00$, $\delta = .61$). This finding demonstrated the effectiveness of attribution training on reading comprehension improvement. This represented the correlation between reading comprehension and students'

motivational beliefs in reading. Students in both treatment groups including the MWR-only and the MWR + MB groups scored higher than the control group on sight word efficiency ($\beta = 5.74$, $\rho = .01$, $\delta = .78$ and $\beta = 4.59$, $\rho = .01$, $\delta = .75$). Additionally, the data on the RAS success subscale of the MWR + MB group was statistically higher than the control group ($\beta = 2.17$, $\rho = .01$, $\delta = .74$). The result revealed that students with MB training developed significantly higher attributions for intrinsic motivations than attributions for extrinsic motivations.

Even though it is noteworthy that the intervention group with MB training demonstrated higher gains on sentence-level reading comprehension, Toste et al. (2017) speculated that the future studies in the embedded motivational beliefs training could include the hierarchy of motivations. They also suggested that the measurement of these motivations such as goals, beliefs, and predisposition proposed by Conradi, Jang, and McKenna (2014) would enhance the impact and provide a deeper understanding of the MB training. Findings from the current investigation recommended exploring the effects of the individual differences on students' response to the instruction.

Zentall and Lee (2012) examined the responses of students with reading disabilities/ difficulties (RD) to a motivational intervention. A total of 80 students in Grades 2-5 were selected from three public schools in the midwestern United States. The study was designed for three groups (RD, ND, and ADHD) in two conditions with or without motivation intervention. The experimenter brought students to a separate room from their classrooms and randomly assigned the equivalent number of students in three groups into two condition groups of 40 students.

Participants who were in the RD group, no disability (ND) group, and the attention deficit hyperactivity disorder (ADHD) group were randomly assigned to the intervention or control condition. Thirty-three students in the RD group including 21 students with both RD and ADHD and 12 students with the only RD without ADHD 17. Additionally, 30 students in the ND group performed at or above grade level on the Indiana Statewide Testing for Education Progress-Plus (ISTEP+, 2008) and the Northwest Evaluation Association (2008). Finally, students in the ADHD group were previously labeled ADHD or with characteristics of inattention or high activities and performed at or above grade level on the group achievement test (ISTEP+ and NWCA).

Their pre- and post-reading skills were assessed individually by the Gray Oral Reading Test (4^{th} ed., GORT-4) (Wiederholt & Bryant, 2001) for 15 to 45 minutes. Students' reading comprehension (the number of correct answers out of five comprehension questions) and fluency (reading accuracy) scores were administrated by the experimenter. During the motivation intervention, students experienced: (a) positive feedback, (b) positive labeling, and (c) external standards. Students were motivated to be better than before and better other students based on internal and external standards as encouraged by positive labeling such as "clever."

The result of the study using ANCOVA yielded medium effect size of the controlled condition group for reading comprehension (F (2, 73) = 5.46, mean-squared error (MSE) = 2.34, p = .006, partial $\eta 2$ = .130), and fluency (F (2, 73) = 2.61, MSE = 2.34, p = .080, partial $\eta 2$ = .067). Moreover, a main effect of experimental condition showed large effect sizes for reading comprehension (F(1, 73) = 17.98, MSE = 2.34, p < .001, partial $\eta 2$ = .198), and for fluency (F(1, 73) = 29.98, MSE = 2.34, p < .001, partial $\eta 2$ = .291). Least square mean (LSM) differences

from the Statistical Analysis System (SAS) General Linear Model (GLM) procedure was used to examine differences in two conditions for each group in comparison. Students in ND and RD groups with the motivation intervention presented significant differences in reading fluency for ND (LSM differences = 4.84, p = .001) and RD (LSM differences = 3.43, p = .001) and in reading comprehension for ND (LSM differences = 3.47, p = .001) and RD (LSM differences = 3.42, p = .001). Furthermore, the result revealed that there were no significant differences between the RD and ND groups with the intervention in reading fluency or in comprehension. These findings indicated the effectiveness of the motivation intervention for students with RD in reading performance, comparing to the result of the RD group without the intervention shown lower reading performance than the ND group in the controlled condition. Only students with ADHD without RD demonstrated no significant reading gains in response to the motivational intervention.

The result of this research demonstrated that the combined intervention (internal standards and external standards with individual feedback and specific labeling) could increase the reading achievement of students with reading disabilities/difficulties (RD). Zentall and Lee (2012) presented the limitations of the study in the generality of the results and procedural limitations. The future research should be designed to generate a more efficient result with younger second- and third-grade students and to assess children's free-reading choice. Furthermore, this study could consider text anxiety due to procedural limitations resulted from a single brief intervention session. The authors suggested providing a comparison of different types of positive labels or praise in future research.

Summary

In this quantitative research, I reviewed 11 studies that evaluated the effectiveness of reading comprehension interventions containing self-regulation strategies for students with reading difficulties in upper elementary and secondary setting. Table 2 summarizes the findings of these studies, which are discussed in Chapter III.

Table 2

Summary of Chapter II Studies: Reading Comprehension Intervention

Study	Sample Size	Intervention	Measurement	Results
Berkeley, Mastropieri, & Scruggs (2011)	59 students	Reading comprehension strategy and attribution retaining	-Comprehension summarization test -Passage-specific content test	-RCS+AR: ES=.94 -RCS: ES=1.44 Delayed posttest -RCS+AR: ES=1.21 -RCS: ES=.71
Berkeley & Riccomini (2011)	319 students	Comprehension monitoring strategy (QRAC the Code)	-Content test	-Gen. Ed: ES=.47 -Sped Ed: ES=.73
Crabtree, Alber-Morgan, & Konrad (2010)	3 students	Self-monitoring strategy of story elements	-Immediate (Story Fact) Recall Accuracy -Quiz Accuracy -Social Validity Questionnaire	Quiz Accuracy: Baselines (0~60%), Self-monitoring (70~100%: 84%), Maintenance (80%~)
Fagella-Luby, Schumacher, & Deshler (2007)	79 students	Story structure strategy including vocabulary and QAR strategies	-Strategy-use test -Unit comprehension test	t (54.4) = -15.3, $p < .001$, $d = .776$ (large effective size)

Table 2 Continued

Study	Sample Size	Intervention	Measurement	Results
Hua et al. (2018)	5 students	Reread-Adapt + Answer-Comprehend (RAAC) with goal-setting intervention for decoding and reading comprehension skills	-CWPM (correct words) AIMSweb passage -DEPM (decoding errors) -ICN (oral retelling)	$\alpha = 0.05$, $\rho = 0.1$ (no effects)
Reed & Lynn (2016)	24 students	Inference-making strategy with goal setting	-*easy*CBM (MC)	IO: $t(8) = 2.76$, $p < .01$ IIG: $t(6) = 3.97$, $p < .01$ IGG: $t(7) = 4.35$, $p < .01$
Rouse & Alber-Morgan (2014)	2 students	Self-questioning (SQ) strategy	-Correct comprehension questions responses	Andrina: 4.3 (53%) Cecil: 3.7 (47%)
Schiller et al. (2012)	871 students	Fusion Reading intervention with motivation strategy	TOWRE SWE & PDE; GRADE passage comprehension, & sentence comprehension; Michigan's MEAP reading	No significance except: TOWRE SWE ($p < .05$, ES = 0.10) GRADE sentence comprehension ($p < .05$, ES = 0.15)
Therrien, Wickstrom, & Jones (2006)	30 students	Reread-Adapt + Answer-Comprehend (RAAC) with question generation strategy	-CWPM -WJ-III -DIBEL	ES=.69
Toste, Capin, & Vaughn (2017)	59 students	Multisyllabic Word Reading intervention	-TOWRE-2 -WRAT4 -RAS	MWR+MB: $\beta = 5.54$, $\rho = .00$, $\delta = .61$
Zentall & Lee (2012)	80 students	Reading fluency (accuracy) and comprehension intervention with motivation strategies	-GORT-4 -ANCOVA -Reading Comprehension -Reading Fluency	Reading comprehension: $F(1, 73) = 17.98$, MSE = 2.34, $p < .001$, partial $\eta 2 = .198$ Fluency: $F(1, 73) = 29.98$, MSE = 2.34, $p < .001$, partial $\eta 2 = .291$

Chapter III: Conclusions and Recommendations

The purpose of this paper is to examine the effectiveness of self-regulation strategies on the reading comprehension development of students with reading difficulties. In the first chapter, relevant theoretical information regarding the reading performance of adolescents with reading difficulties was provided. Chapter II includes a critical review of research to evaluate the effects of self-regulation strategies on reading comprehension skills of struggling readers. This chapter discusses findings of the 11 studies, as discussed in the previous chapter, and provides recommendations for future research, as well as implications for the practice of teaching reading comprehension for students with reading difficulties.

Conclusions

Reading is one of the most essential skills for student success, yet many struggling readers suffer from social, personal, and economic limitations (Russell, 2012). These unmotivated readers often demonstrate different behavior problems in school (Christle & Yell, 2008). Kutner et al. (2007) documented that adults with advanced literacy skills are likely to receive higher salaries over their lifetime. This indicates that the literacy gap between poor readers and proficient readers results in an unstable, unproductive, or tumultuous future. In an effort to narrow the literacy gap, Morgan and Sideridis (2006) stated that struggling readers can benefit from explicit reading instruction.

Tankersley (2005) stated that, by the time students reached fourth grade, teachers shift their expectations in the literacy curriculum from "learning to read" to "read to learn" in the different content areas. Mason, Meadan-Kaplansky, Hedin, and Taft (2013) defined students who struggle with learning "may not have the metacognition which is required to understand the

content." Contrarily, competent readers can self-regulate comprehension (Minguela et al., 2015). Therefore, it is necessary for these students who already reached basic skills proficiency to include the strategies to promote critical thinking processes including the self-regulating learning model (Mason et al., 2013). For these reasons, this study focused specifically on how students perceive self-regulation strategies during reading comprehension strategy intervention. Eleven studies discussed in Chapter II used quantitative research designs to evaluate reading comprehension interventions containing self-regulation strategies.

Based upon the current review, question generation strategies and self-monitoring strategies as self-regulation skills can be effective in support of significant differences between the intervention condition and the control condition in results of the interventions in this study. Goal-setting and self-reinforcement as the self-regulation strategies included in the limited number of researches demonstrated small or no significant effect size in the result. On the other hand, compared to the single strategy approach, the intervention containing multiple reading comprehension strategies conducted by Fagella-Luby et al. (2007) and another intervention using self-regulation as a framework investigated by Souvignier and Mokhlesgerami (2006) supported the effectiveness of the multiple strategy approach **(**Mason et al., 2013).

Mason et al. (2013) defined students who struggle with learning "may not have the metacognition which is required to understand the content." On the other hand, competent readers can self-regulate comprehension (Minguela et al., 2015). Therefore, instructions for these students should use strategies to promote the critical thinking process by including the self-regulating learning model (Mason et al., 2013). In conclusion, implementing metacognitive strategy intervention can be effective for students with reading difficulties. In the education

field, it is not uncommon to observe many students with reading difficulties, even those who are able to decode the content, suffering from a deficit in reading comprehension. Therefore, this result of the study revealed the effectiveness of reading comprehension strategy interventions containing self-regulation strategy components benefits instructors who teach those students.

Reading Comprehension Strategy Interventions

Reading comprehension strategy components within the 11 reviewed studies included various reading strategies used before, during, and after reading. There are strategies included activating prior knowledge, setting a purpose, previewing, prediction, and identifying main ideas during pre-reading (Berkeley, Marshak et al., 2011). Furthermore, more reading strategies for retelling, summaries, self-questioning, vocabulary clarification, and identification of text structure on both narrative and expository text were included. Within 11 interventions, the most common reading strategy was the question generation which was identified in seven studies. Moreover, vocabulary strategy (Fagella-Luby et al., 2007; Schiller et al., 2012; Toste et al., 2006) and summarization of information through oral or written retellings were commonly found as reading strategies (Berkeley, Marshak et al, 2011; Crabtree et al., 2010; Fagella-Luby et al., 2007).

There was one striking aspect of one study (Fagella-Luby et al., 2007) which included all three reading strategies previously mentioned as the most common strategies within this study such as question generation, vocabulary, and summarization. Furthermore, it was noteworthy that the results of the study demonstrated a statistically significant large effect between the experimental and comparison conditions. It revealed that multifaceted reading instructional

approaches for reading comprehension help improve students' knowledge acquisition than a single strategy approach (Jitendra, Burgess, & Gajria, 2011).

Although question generation was the most commonly found strategy in this study, not all research facilitated the same approach. The questioning strategy investigated by Berkeley Marshak et al. (2011) and Crabtree et al. (2010) utilized question words such as who, what, when, where, which, how, and why and the graphic organizer analyzing story structure and story facts (Fagella-Luby et al., 2007). Furthermore, QRAC the code strategy investigated by Berkeley and Riccomini (2011) required to identify and utilize headings into questions. Self-question training designed by Rouse and Alber-Morgan (2014) including underlying an important or interesting fact in the paragraph to generate questions. Finally, RAAC intervention investigated by Therrien et al. (2006) differentiated question generating intervention by providing a single word prompt for high-level readers to generate questions while story structure questions were provided for beginning readers.

Table 3 illustrates more clearly reading comprehension strategy components in 11 interventions reviewed in this study. The table provides insights on the comparison of the interventions based on the type and procedure and of the effect size of each specific intervention.

Table 3

Reading Comprehension Strategy Components

Author (Year)	Comparison	Number of Participants and Grade(s)	Comprehension Strategy Components	Comprehension Measures	Results
Berkeley, Mastropieri, & Scruggs (2011)	- Reading Comprehension strategies + Attribution Retaining (RCS+AR) -RCS -Read Naturally (RN)	-59 students (45 LD, 14 OHI) -7th, 8th, 9th grades	-Setting Purpose -Previewing -Activating background Knowledge -Self-questioning -Summarizing	-Comprehension summarization test -Passage-specific content test	-RCS+AR: ES=.94 -RCS: ES=1.44 Delayed posttest -RCS+AR: ES=1.21 -RCS: ES=.71
Berkeley & Riccomini (2011)	-Comprehension monitoring -Independent reading	-319 students (27 LD, 4 OHI, 288 general education) -6th,7th grades	QRAC the Code -Question (turning headings to questions) -Read -Answer (RC questions) -Check (feedback)	-Content test	-Gen. Ed: ES=.47 -Sped Ed: ES=.73
Crabtree, Alber-Morgan, & Konrad (2010)	*Pre-&post-test -Baseline -Self-monitoring intervention -Maintenance	-3 students with LD (2 ADHD) -High school seniors (age 17-18)	-Self-monitoring response sheets asking story elements -Immediate recall worksheet -Comprehension quizzes	-Immediate (Story Fact) Recall Accuracy -Quiz Accuracy -Social Validity Questionnaire	Quiz Accuracy: Baselines (0~60%), Self-monitoring (70~100%: 84%), Maintenance (80%~)
Fagella-Luby, Schumacher, & Deshler (2007)	-Embedded story structure (ESS) -Comp. skills instruction (CSI)	-79 students (14 LD) -9th grades	-The LINCS vocabulary strategy -Question-Answer Relationships (QAR) strategy ("Right There" & "Think and Search") -Summary writing	-Strategy-use test -Unit comprehension test	t (54.4) = -15.3, $p < .001$, $d = .776$ (large effective size)
Hua et al. (2018)	-RAAC+Goal Setting -Pre- & Post-test (CWPM/DEPM/Oral retelling)	-5 students with ID -Postsecondary	* Reread-Adapt + Answer-Comprehend (RAAC) -Cue cards w/ comprehension questions -Decoding and answering questions (factual & inferential RC questions) -Explicit teaching procedure (teacher modeling) -Least intrusive prompting procedure (guided practice)	-CWPM (correct words) AIMSweb passage -DEPM (decoding errors) -ICN (oral retelling)	$\alpha = 0.05$, $\rho = 0.1$ (no effects)

Table 3 Continued

Author (Year)	Comparison	Number of Participants and Grade(s)	Comprehension Strategy Components	Comprehension Measures	Results
Reed & Lynn (2016)	-Inference Only (IO) -IIG -IGG	-24 students -5th~8th grades	*Inference-making strategy -A list of 12 stem -Inference graphic organizer	-*easy*CBM (MC)	IO: $t(8)=2.76$, $p < .01$ IIG: $t(6)=3.97$, $p < .01$ IGG: $t(7)=4.35$, $p < .01$
Rouse & Alber-Morgan (2014)	*Pre-&post-test -Baseline -Self-questioning (SQ) -Maintenance & Generalization	-2 students with LD -5th grades	-Embedded questioning (EQ) Training (teacher-generated questions) -SQ Training (student-generated questions)	-Correct comprehension questions responses	Andrina: 4.3 (53%) Cecil: 3.7 (47%)
Schiller et al. (2012)	-Fusion Reading intervention condition (supplementary) -Control condition (non-literacy)	-871 students -6th~10th grades	Fusion Reading intervention: explicit comprehension & vocabulary strategies including paraphrasing, visual imagery, and self-questioning, mnemonics, and writing and error monitoring	Reading achievement measures [TOWRE SWE & PDE; GRADE passage comprehension, & sentence comprehension]	No significance except: TOWRE SWE ($p < .05$, ES = 0.10) GRADE sentence comprehension ($p < .05$, ES = 0.15)
Therrien, Wickstrom, & Jones (2006)	-RAAC intervention -Traditional reading	-30 students (16 LD, 13 at risk) -4th~8th grades	-Reread-Adapt + Answer-Comprehend (RAAC): rereading & answer RC questions -Question generation intervention: differentiated questions generation (beginners-story structure questions & advanced readers-single word prompt)	-CWPM -WJ-III -DIBEL	ES=.69
Toste, Capin, & Vaughn (2017)	-MWR only -MWR+MB -Control	-59 students -3rd & 4th grades	-Multisyllabic Word Reading intervention: vowel patterns, affixes, & base words -Repeated reading: speedy reading & text reading	-TOWRE-2 -WRAT4 -RAS	MWR+MB: $\beta = 5.54$, $\rho = .00$, $\delta = .61$
Zentall & Lee (2012)	-Motivation intervention -Control group -ND vs. RD vs. ADHD	-80 students -2nd~5th grades	-Fluency: reading accuracy -Reading comprehension: answering questions -Positive feedback & labeling: internal + external goals	-GORT-4 -ANCOVA -Reading Comprehension -Reading Fluency	Reading comprehension: $F(1, 73) = 17.98$, MSE = 2.34, $p < .001$, partial $\eta 2 = .198$ Fluency: $F(1, 73) = 29.98$, MSE = 2.34, $p < .001$, partial $\eta 2 = .291$

Self-Regulation Strategies

Components of strategies intended to foster a self-regulated learning model within 11 reviewed studies were also identified. For the SRL framework for this study, four main constructs proposed by Mason, Reid, and Hagaman (2012) were utilized for self-regulating learning process: (a) goal setting, (b) self-monitoring, (c) self-instruction, and (d) self-reinforcement. Fisher (1969) developed the self-instruction program involving steps including cognitive modeling, guidance, self-guidance, fading self-guidance, and generalization. Due to self-instruction components in self-regulation strategies were embedded throughout the process of implementing interventions (Rouse & Alber-Morgan, 2014; Schiller et al., 2012; Therrien et al., 2006), self-instruction was not particularly discussed as a self-regulation strategy component in this part. However, a description of self-regulation strategies including goal setting, self-monitoring, and self-reinforcement embedded within reading comprehension interventions follows.

First, goal setting could include goals to use strategies or to comprehend the content (Berkeley & Larsen, 2018). Unfortunately, the result of the RAAC intervention with the goal setting strategy investigated by Hua et al. (2018) failed to demonstrate the effectiveness of intervention due to no significant difference between the experimental group and the control group. In addition, the results of Schiller et al.'s (2012) research about goal-setting intervention in Fusion Reading program only demonstrated positive word reading outcomes, albeit no significant impact on reading comprehension outcome. Despite the lack of evidence for the effectiveness of goal setting skills embedded in reading comprehension interventions, it was still noteworthy that findings from Reed and Lynn's (2016) research indicated that setting a goal as a

group was statistically substantially beneficial than setting a goal as an individual during inference making the intervention.

Furthermore, Table 4 illuminates the goal setting strategy as self-regulation strategy components identified in three interventions within this study. Table 4 provides insights on the comparison of the interventions based on the type and procedure.

Table 4

Goal Setting

	Self-Regulation Componence	Self-Regulation Procedure	Study Length	Class Size	Result
Hua et al. (2018)	Goal setting	-Comprehension monitoring: cue cards with comprehension questions -Goal setting procedures: set a goal, graph, feedback using CWPM	5, 9, and 14 sessions	Small group (1-2 students each time)	$\alpha = 0.05$, $\rho = 0.1$ (no effects)
Reed & Lynn (2016)	Goal setting	Goal setting: goal setting form: (Group goals vs. individual goals, depending their baselines-CWPM)	40 mins + 2 mins goal setting x 7 sessions/ 1-2 times per wk	IO (n=9) IIG (n=7) IGG (n=8)	IO: $t(8)=2.76$, $p < .01$ IIG: $t(6)=3.97$, $p < .01$ IGG: $t(7)=4.35$, $p < .01$
Schiller et al. (2012)	-Goal setting -Self-monitoring	Explicit comprehension, and motivation strategies instructions (goal setting & highly engaging materials) including scaffold instruction, practice, feedback, and monitoring progress	50 mins x 5 times/wk x 1~2 years	No more than 15 students per class	No significance except: TOWRE SWE ($p < .05$, ES = 0.10) GRADE sentence comprehension ($p < .05$, ES = 0.15)

Next, self-regulation of performance was mainly fostered through different forms of self-monitoring of strategy use and comprehension in five studies. The comprehension monitoring skill as a self-regulation strategy including self-check or self-evaluation was most commonly found in this study. Strategy monitoring was generally promoted through the use of the strategy monitoring sheet (Berkeley, Marshak et al., 2011; Crabtree et al., 2010). While these strategies were intended to foster self-monitoring of strategy use, some studies were intended to promote

self-monitoring strategies to require students to demonstrate understandings of the content and evaluate their strategic behavior.

Self-monitoring reading comprehension of the text they read was generally promoted through the use of visual cue cards (Fagella-Luby et al., 2007; Hua et al., 2018), graphic organizers (Fagella-Luby et al., 2007), and self-monitoring response sheet (Berkeley, Marshak et al., 2011; Crabtree et al., 2010). Furthermore, Rouse and Alber-Morgan (2014) included underlying an important or interesting fact in the paragraph to generate questions. Berkeley and Riccomini (2011) investigated a self-question strategy using QRAC the code strategy that required students to turn headings in their social studies textbooks into questions, read, answer the questions, and, then, check their answers. When students checked to be sure your answer was correct or summarize the section, it was required to monitor and self-evaluated their comprehension of the text by asking themselves whether they understand what they read or not (Berkeley & Riccomini, 2011).

In addition, Table 5 examines the self-monitoring strategy as self-regulation strategy components mainly targeted in five interventions within this study. Table 5 provides insights on the comparison of the interventions based on the type and procedure.

Table 5

Self-Monitoring

	Self-Regulation Componence	Self-Regulation Procedure	Study Length	Class Size	Result
Berkeley & Riccomini (2011)	Self-monitoring	Comprehension monitoring strategy -QRAC-the CODE (Self-questioning) -Self-monitoring sheet	20 mins x 3 sessions (days)/wk	Whole Class	-Gen. Ed: ES=.47 -Sped Ed: ES=.73
Crabtree, Alber-Morgan, & Konrad (2010)	Self-monitoring	-Self-monitoring response sheet at three stopping points (fading in maintenance step) -Immediate recall worksheet -10-item short answer comprehension quiz	15-30 mins x 3 sessions (days)/wk -at least 5 sessions for intervention (total 14-15 sessions including baselines & maintenance)	One-on-one instruction within a small group of three students (total of 9 students in the classroom)	Quiz Accuracy: Baselines (0~60%), Self-monitoring (70~100%: 84%), Maintenance (80%~)
Fagella-Luby, Schumacher, & Deshler (2007)	Self-monitoring	-Self-questioning (QAR strategy) -Story-structure analysis - Semantic summary mapping (Summarizing) -ESS/CSI organizer	90 mins (Day1&9) + 120 mins (Day 2~8) = total 17 hours for 9 days	12~14 students each time (per a teacher)	t (54.4) = -15.3, p < .001, d = .776 (large effective size)
Rouse & Alber-Morgan (2014)	Self-monitoring	-Embedded questioning (EQ) Training -SQ Training: "think aloud" model & underlying the key information for SQ -SQ Fading -Maintenance/ Generalization	30 mins x 2-3 sessions/wk (total of 33 sessions/posttest 3 & 6 wks after)	One-on-one	Andrina: 4.3 (53%) Cecil: 3.7 (47%)
Therrien, Wickstrom, & Jones (2006)	Self-monitoring	-Answer-Comprehend: using cue cards with the generic story structure questions while reading	10-15 mins/ 50 passages over 4 months	Pullout -RAAC (n=15)/ Traditional(n=14)	ES=.69

Finally, the self-reinforcement refers to the self-administered positive or negative consequences (Mason et al., 2013). To promote self-administered positive or negative consequences, attribution training and strategy value feedback included encouragement for students to attribute successful performance to their effort and strategy use (Berkeley & Larsen, 2018).

Three studies included the specific strategy that valued feedback and reinforced student use of strategies. These studies provided explicit attribution retaining to teach students to

attribute their reading comprehension to strategy use and effort (Berkeley, Marshak et al., 2011; Toste et al., 2017; Zentall & Lee, 2012). Reading comprehension strategy (RCS) instruction with and without attribution retraining (AR) conducted by Berkeley, Marshak et al. (2011), the AR strategies instruction was provided by helping students identify positive thoughts and develop positive self-talk statements through simple/complex scenarios. The results represented that, although there was no significant difference shown between two treatment groups, both RCS+AR and RCS groups outperformed the comparison group, $F(16, 39) = .87$, $p = .60$ (respectively, $p = .000$ and $p = .005$). In addition, Toste et al. (2017) implemented motivational behavior training by sharing their readiness on a scale from one to five using the "Check-in" poster. During sessions, students learned to identify negative thoughts and develop self-motivation through scenarios and tutor modeling. The results of the study demonstrated the effectiveness of attribution training to promote students' motivational beliefs in reading. Lastly, during the motivational intervention investigated by Zentall and Lee (2012), students were motivated to be better than before and better than other students (internal and external standards) as encouraged by positive labeling such as "clever." Findings from this study indicated the effectiveness of the motivation intervention for students with RD in reading performance, comparing to the result of the RD group without the intervention.

Table 6 clarifies the self-reinforcement strategy as self-regulation strategy components identified in three interventions within this study. Table 6 provides insights on the comparison of the interventions based on the type and procedure.

Table 6

Self-Reinforcement

	Self-Regulation Componence	Self-Regulation Procedure	Study Length	Class Size	Result
Berkeley, Mastropieri, & Scruggs (2011)	-Attribution Training -Self-monitoring	-Self-monitoring sheet -Attribution Retaining (Identifying positive Thoughts, Self-talk, feedback)	30 mins x 12 sessions/ 4 weeks (Delayed posttest after 6 weeks)	RCS+AR (n=19) RCS(n=20) RN(n=20)	-RCS+AR: ES=.94 -RCS: ES=1.44 Delayed posttest -RCS+AR: ES=1.21 -RCS: ES=.71
Toste, Capin, & Vaughn (2017)	Attribution Training	Motivational Behavior (MB) training: -"Check-in" poster (readiness 0-5) -Scenarios (identify negative thoughts & generate positive self-motivated statement)	40 mins/ 3 times per wk over 8 wk (total of 24 sessions)	Small group (2-3 students) -MWR only (n=18) -MWR+MB (n=19) -Control (n=22)	MWR+MB: β = 5.54, ρ = .00, δ = .61
Zentall & Lee (2012)	-Attribution training -Goal setting	Motivation intervention -Positive feedback (internal standards) -Positive labeling (positive self-perception: "Good readers are..," "Who is clever?") -External standard ("I think you can be as clever as …," "I think you can complete level 6 of reading task.")	Pre- & post-test (15~45 minutes)/ 5~10-minute intervention-1 time	Pullout One-on-one -Control (n=40) -Intervention (n=40)	Reading comprehension: $F(1, 73) = 17.98$, MSE = 2.34, $p < .001$, partial $\eta 2 = .198$ Fluency: $F(1, 73) = 29.98$, MSE = 2.34, $p < .001$, partial $\eta 2 = .291$

In conclusion, self-regulation strategy instructions embedded in reading comprehension strategy interventions can be beneficial for students with reading difficulties to promote their reading comprehension development. Particularly, self-monitoring strategies as a self-regulation skill in reading comprehension strategy interventions indicated significant differences between the intervention condition and the control. Comparing to self-monitoring strategies, goal-setting and self-reinforcement as the self-regulation strategies demonstrated small or no significant effect size in the result.

Finally, Table 7 illustrates more clearly self-regulation strategy components in 11 interventions reviewed in this study. The table provides insights on the comparison of the interventions based on the type and procedure and of the effect size of each specific intervention.

Table 7

Self-Regulation Strategy Components

	Self-Regulation Componence	Self-Regulation Procedure	Study Length	Class Size	Instruction Provider
Berkeley, Mastropieri, & Scruggs (2011)	-Attribution Training -Self-monitoring	-Self-monitoring sheet -Attribution Retaining (Identifying positive Thoughts, Self-talk, feedback)	30 mins x 12 sessions/ 4 weeks (Delayed posttest after 6 weeks)	RCS+AR (n=19) RCS(n=20) RN(n=20)	Sped Teacher(n=5), a reading specialist(n=1), & a trained researcher(n=1)
Berkeley & Riccomini (2011)	Self-monitoring (RC & RC strategy use)	Comprehension monitoring strategy -QRAC-the CODE (Self-questioning) -Self-monitoring sheet	20 mins x 3 sessions (days)/wk	Whole Class	Classroom teachers (n=2) & researchers(n=3)
Crabtree, Alber-Morgan, & Konrad (2010)	Self-monitoring	-Self-monitoring response sheet at three stopping points (fading in maintenance step) -Immediate recall worksheet -10-item short answer comprehension quiz	15-30 mins x 3 sessions (days)/wk -at least 5 sessions for intervention (total 14-15 sessions including baselines & maintenance)	One-on-one instruction within a small group of three students (total of 9 students in the classroom)	Experimenter/first author (n=1)
Fagella-Luby, Schumacher, & Deshler (2007)	Self-monitoring	-Self-questioning (QAR strategy) -Story-structure analysis - Semantic summary mapping (Summarizing) -ESS/CSI organizer	90 mins (Day1&9) + 120 mins (Day 2~8) = total 17 hours for 9 days	12~14 students each time (per a teacher)	The primary researcher (n=1)
Hua et al. (2018)	-Goal setting - Self-monitoring	-Comprehension monitoring: cue cards with comprehension questions -Goal setting procedures: set a goal, graph, feedback using CWPM	5, 9, and 14 sessions	Small group (1-2 students each time)	2 instructors
Reed & Lynn (2016)	Goal setting	Goal setting: goal setting form: (Group goals vs. individual goals, depending their baselines-CWPM)	40 mins + 2 mins goal setting x 7 sessions/ 1-2 times per wk	IO (n=9) IIG (n=7) IGG (n=8)	2 researchers (one for each school)

Table 7 Continued

	Self-Regulation Componence	Self-Regulation Procedure	Study Length	Class Size	Instruction Provider
Rouse & Alber-Morgan (2014)	Self-monitoring	-Embedded questioning (EQ) Training -SQ Training: "think aloud" model & underlying the key information for SQ -SQ Fading -Maintenance/ Generalization	30 mins x 2-3 sessions/wk (total of 33 sessions/posttest 3 & 6 wks after)	One-on-one	1 primary & 2 secondary data collectors
Schiller et al. (2012)	-Goal setting -Self-monitoring	Explicit comprehension, and motivation strategies instructions (goal setting & highly engaging materials) including scaffold instruction, practice, feedback, and monitoring progress	50 mins x 5 times/wk x 1~2 years	No more than 15 students per class	7 teachers
Therrien, Wickstrom, & Jones (2006)	Self-monitoring	-Answer-Comprehend: using cue cards with the generic story structure questions while reading	10-15 mins/ 50 passages over 4 months	Pullout -RAAC (n=15)/ Traditional(n=14)	13 undergraduate students, sped teacher candidates
Toste, Capin, & Vaughn (2017)	Attribution Training	Motivational Behavior (MB) training: -"Check-in" poster (readiness 0-5) -Scenarios (identify negative thoughts & generate positive self-motivated statement)	40 mins/ 3 times per wk over 8wk (total of 24 sessions)	Small group (2-3 students) -MWR only (n=18) -MWR+MB (n=19) -Control (n=22)	4 tutors
Zentall & Lee (2012)	-Attribution training -Goal setting	Motivation intervention -Positive feedback (internal standards) -Positive labeling (positive self-perception: "Good readers are..," "Who is clever?") -External standard ("I think you can be as clever as …," "I think you can complete level 6 of reading task.")	Pre- & post-test (15~45 minutes)/ 5~10-minute intervention-1 time	Pullout One-on-one -Control (n=40) -Intervention (n=40)	The experimenter (n=1)

Recommendations for the Future Research

In a more recent review on reading comprehension interventions containing self-regulated learning components, Berkeley and Larsen (2018) reviewed 18 studies between 1985 and 2006 in their quantitative synthesis. This study had a narrow focus on reading comprehension strategy intervention containing self-regulation components for students with a learning disability. Findings showed an overall weighted mean effect size of 1.35 for all interventions and the mean effect size of .95. In other words, students were able to internalize

and maintain knowledge and usage of reading comprehension strategy. The results suggested the effectiveness of reading intervention on reading comprehension strategies containing self-regulation components.

Even though this literature review resulted in a similar conclusion, unfortunately, there are limitations since this study was quantitative analysis, not meta-analysis like Berkeley and Larsen's (2018)study. The effect size used for each study is to measure effectiveness of the study within the intervention, which was not comparable between the interventions. Therefore, for a more authentic overall comparison, one effect size for each intervention should be calculated by the same measure for the future study.

Another recommendation is to include different test measurements. Many of the studies reviewed in this study measure students' competency in reading comprehension by reading comprehension quizzes or the responses on comprehension questions. Minguela et al. (2015) recommended the use of online and offline measures in reading comprehension interventions. The researchers suggested the need for collecting both online (reading traces) and offline (meta-cognitive judgments) data measure students' reading comprehension rather than one measure. The future study should include various test measurements to analyze "deep" and "superficial" understanding of the text (Minguela et al., 2015).

Implications for Practice

The purpose of strategy-based interventions is to teach students how to facilitate systemic problem-solving procedures utilizing literacy skills to comprehend the content they are reading **(**Meyer & Felton, 1999). Over the last few decades, the current trends in strategy interventions have been shifting from a single strategy approach to multiple strategy approach **(**Mason et al.,

2013). A movement toward multi-strategy intervention allowed interventionists to combine various strategy instructions and take a more flexible approach in reading instruction (Gersten, Fuchs, Williams, & Baker, 001). Edmonds et al. (2009) and Scammacca et al. (2007) meta-analyses suggested that interventions targeting multiple reading areas by teaching the use of multiple strategies are most effective for struggling adolescent readers.

Rouse and Alber-Morgan (2014) recommended self-questioning strategies can benefit students, especially students with learning disabilities to improve reading comprehension. The teacher can implement strategies with various types of text for different genres and customize instructions for students in different age groups and ability levels. Finally, the self-questioning intervention package used in the study can be leveled with a variety of subject areas, in different environmental settings and instructional group settings.

Teachers can implement self-questioning, paraphrasing, and word strategies instructed as a specific instructional routine supported by self-regulation strategies. Self-regulation components can be included in reading interventions by not only teaching students the steps of the strategy, but also teaching why/how/when to use the strategy. Moreover, self-monitoring can be utilized for both the strategy use and understanding of the content students read by using the strategy sheet and cue cards while answering the question. Lastly, the teacher can reinforce students to take ownership of their learning by encouraging students to attribute successful performance to their effort and strategy use.

Effective reading teachers are flexible and understand students' needs. Instructions should be explicit and systematic and provide guided practice as they employ new learning, and independent practice using a variety of materials to enhance reading skills and close literacy gap

to improve students' understandings of subject areas which influence students' success in academic achievement.

Summary

The intention of this literature review is to examine the effectiveness of self-regulation strategies on the reading comprehension development of students with reading difficulties. Based on this literature review, the 11 research studies in this study support the conclusion of the effectiveness of reading intervention on reading comprehension strategies containing self-regulation components. To be specific, question generation strategies and self-monitoring strategies as self-regulation skills can be effective to promote reading comprehension development for struggling adolescent readers. Furthermore, the findings suggest the effectiveness of the multiple strategy approach compared to the single strategy approach. Finally, the results support that students were able to internalize and maintain knowledge and usage of reading comprehension strategy supported by the self-regulated learning model.

References

Afflerbach, P., Pearson, P., & Paris, S. (2008). Clarifying differences between reading skills and reading strategies. *The Reading Teacher, 61*(5), 364-373.

Alonzo, J., Tindal, G., Ulmer, K., & Glasgow, A. (2006). *easyCBM online progress monitoring assessment system*. Eugene, OR: Center for Educational Assessment Accountability.

American Association on Intellectual and Developmental Disabilities. (2010). *Definition of intellectual disability.* Retrieved from http://aaidd.org/intellectual-disability/definition

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

Berkeley, S., & Larsen, S. (2018). Fostering self-regulation of students with learning disabilities: Insights from 30 years of reading comprehension intervention research. *Learning Disabilities Research and Practice, 33*(2), 75-86.

Berkeley, S., & Riccomini, P. (2011). QRAC-the-code: A comprehension monitoring strategy for middle school social studies textbooks. *Journal of Learning Disabilities, 46*(2), 154-165.

Berkeley, S., Marshak, L., Mastropieri, M., & Scruggs, T. (2011). Improving student comprehension of social studies text: A self-questioning strategy for inclusive middle school classes. *Remedial and Special Education, 32*(2), 105-113.

Berkeley, S., Mastropieri, M., & Scruggs, T. (2011). Reading comprehension strategy instruction and attribution retraining for secondary students with learning and other mild disabilities. *Journal of Learning Disabilities, 44*(1), 18-32.

Chapman, J., & Tunmer, W. (2003). Reading difficulties, reading-related self-perceptions, and strategies for overcoming negative self-beliefs. *Overcoming Learning Difficulties*, *19*(1), 5-24.

Christle, C., & Yell, M. (2008). Preventing youth incarceration through reading remediation: issues and solutions. *Reading and Writing Quarterly*, *24*(2), 148-176.

Conradi, K., Jang, M., & McKenna, M. (2014). Motivation terminology in reading research: A conceptual review. *Educational Psychology Review*, *26*, 127-164.

Coutinho, S. (2007). The relationship between goals, metacognition, and academic success. *Education Journal, 7*(1), 39-47.

Crabtree, T., Alber-Morgan, S., & Konrad, M. (2010). The effects of self-monitoring of story elements on the reading comprehension of high school seniors with learning disabilities. *Education and Treatment of Children, 33*(2), 187-203.

Edmonds, M., Vaughn, S., Wexler, J., Reutebuch, C., Cable, A., Tackett, K., & Schnakenberg, J. (2009). A synthesis of reading interventions and effects on reading comprehension outcomes for older struggling readers. *Review of Educational Research, 79*(1), 262-300.

Fagella-Luby, M., Schumacher, J., & Deshler, D. (2007). Embedded learning strategy instruction: Story-structure pedagogy in heterogeneous secondary literature classes. *Learning Disability Quarterly, 30,* 131-147.

Fisher, J. (1969). *Reading to discover organization: A program for self-instruction*. New York: McGraw-Hill.

Gersten, R., Fuchs, L., Williams, J., & Baker, S. (2001). Teaching reading comprehension strategies to students with learning disabilities: A review of research. *Review of Educational Research*, *71*(2), 279-320.

Hebert, M., Bohaty, J., Nelson, J., & Lambert, M. (2018). Identifying and discriminating expository text structures: An experiment with 4th and 5th grade struggling readers. *Reading and Writing, 31*(9), 2115-2145.

Hock, M. F., Brasseur-Hock, I. F., Hock, A. J., & Duvel, B. (2017). The effects of a comprehensive reading program on reading outcomes for middle school students with disabilities. *Journal of Learning Disabilities*, *50*(2), 195-212.

Hua, Y., Yuan, C., Monroe, K., Hinzman, H., Alqahtani, S., Alwahbi, A., & Kern, A. (2018). Effects of the reread-adapt and answer comprehend and goal setting intervention on decoding and reading comprehension skills of young adults with intellectual disabilities. *Developmental. Neurorehabilitation*, *21*(5), 279-289.

ISTEP+ (2008). *Indiana statewide testing for educational progress-plus*. New York, NY: Grow Network/McGraw-Hill.

Jitendra, A., Burgess, C., & Gajria, M. (2011). Cognitive strategy instruction for improving expository text comprehension of students with learning disabilities: The quality of evidence. *Exceptional Children*, *77*(2), 135-159.

Kutner, M., Greenberg, E., Jin, Y., Boyle, B., Hsu, Y., & Dunleavy, E. (2007). *Literacy in everyday life : Results from the 2003 National Assessment of Adult Literacy*. Washington, DC: National Center for Education Statistics.

Learning Disabilities Association of America. (2015). *Types of learning disabilities*. Retrieved from https://ldaamerica.org/types-of-learning-disabilities/

Manset-Williamson, G., & Nelson, J. (2005). Balanced, strategic reading instruction for upper-elementary and middle school students with reading disabilities: A comparative study of two approaches. *Learning Disability Quarterly, 28*(1), 59-74.

Manset-Williamson, G., Dunn, M., Hinshaw, R., & Nelson, J. (2008). The impact of self-questioning strategy use on the text-reader assisted comprehension of students with reading disabilities. *International Journal of Special Education, 23*(1), 123-135.

Mason, L., Meadan-Kaplansky, H., Hedin, L., & Taft, R. (2013). Self-regulating informational text reading comprehension: Perceptions of low-achieving students. *Exceptionality, 21*(2), 69-86.

Mason, L., Reid, R., & Hagaman, J. (2012). *Building comprehension in adolescents: Powerful strategies for improving reading and writing in content areas*. Baltimore, MD: Brookes Publishing Company.

Massey, D. (2009). Self-regulated comprehension. In S. E. Israel and G. G. Duffy (Eds.), *Handbook of research on reading comprehension*

(pp. 389-399). New York, NY: Routledge.

McCollin, M., & O'Shea, D. (2006). Improving literacy skills of students from culturally and linguistically diverse backgrounds. *Multiple Voices, 9*, 92-107.

Mellard, D., McKnight, M., & Jordan, J. (2010). RTI tier structures and instructional intensity. *Learning Disabilities Research and Practice, 25*(4), 217-225.

Meyer, M., & Felton, R. (1999). Repeated reading to enhance fluency: Old approaches and new directions. *Annals of Dyslexia*, *49*, 283-306.

Midgley, G. (2000). *Contemporary systems thinking: Systemic intervention*. Boston, MA: Springer.

Minguela, M., Solé, I., & Pieschl, S. (2015). Flexible self-regulated reading as a cue for deep comprehension: Evidence from online and offline measures. *Reading and Writing: An Interdisciplinary Journal*, *28*(5), 721-744.

Morgan, P., & Sideridis, G. (2006). Contrasting the effectiveness of fluency interventions for students with or at risk for learning disabilities: A multilevel random coefficient modeling meta-analysis. *Learning Disabilities Research and Practice*, *21*(4), 191-210.

National Center for Education Statistics [NCES]. (2015). *The nation report's card: Reading 2015. National assessment of educational progress at grades 4 and 8.* Retrieved from http://www.nationsreportcard.gov/reading_math_2015/files/2015_Results_Appendix_Reading.pdf.

National Institute of Mental Health. (2016). *Attention-deficit/hyperactivity disorder*. Retrieved from https://www.nimh.nih.gov/health/topics/attention-deficit-hyperactivity-disorder-adhd/index.shtml

National Joint Committee on Learning Disabilities. (2008). Adolescent literacy and older students with learning disabilities. *Learning Disability Quarterly*, *31*(4), 211-218.

National Reading Panel. (2000). Report of the National Reading Panel. *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups* (NIH Pub. No. 00-4754). Washington, DC: National Institute of Child Health and Human Development.

Nelson, J., & Manset-Williamson, G. (2006). The impact of explicit, self-regulatory reading comprehension strategy instruction on the reading specific self-efficacy, attributions, and affect of students with reading disabilities. *Learning Disability Quarterly, 29*, 213-230.

Numrich, C., & Kennedy, A. (2017). Providing guided practice in discourse synthesis. *TESOL Journal, 8*(1), 28-43.

Northwest Evaluation Association [NWEA]. (2008). *NWEA Student progress report*. Portland, OR: Author.

O'Connor, R., Bocian, K., Beach, K., Sanchez, V., & Flynn, L. (2013). Special education in a 4-year response to intervention (RtI) environment: Characteristics of students with learning disability and grade of identification. *Learning Disabilities Research and Practice*, *28*(3), 98–112.

Reed, D., & Lynn, D. (2016). The effects of an inference-making strategy taught with and without goal setting. *Learning Disability Quarterly, 39*(3), 133-145.

Rittle-Johnson, B. (2006). Promoting transfer: Effects of self explanation and direct instruction. *Child Development, 77*(1), 1-15.

Roberts, G., Torgesen, J., Boardman, A., & Scammacca, N. (2008). Evidence-based strategies for reading instruction of older students with learning disabilities. *Learning Disabilities Research and Practice, 23*(2), 63-69.

Rouse, C., & Alber-Morgan, S. (2014). Using prompt fading to teach self-questioning to fifth graders with LD: effects on reading comprehension. *Learning Disabilities Research and Practice, 29*(3), 117-125.

Russell, J. (2012). *The impact of fluency intervention on the oral reading fluency and comprehension of middle school students with learning disabilities*. Ann Arbor MI: ProQuest LLC.

Sáenz, L., & Fuchs, L. (2002). Examining the reading difficulty of secondary students with learning disabilities: Expository versus narrative text. *Remedial and Special Education, 23*(1), 31-41.

Scammacca, N., Roberts, G., Vaughn, S., Edmonds, M., Wexler, J., Reutebuch, C., & Torgesen, J. (2007). *Interventions for adolescent struggling readers: A meta-analysis with implications for practice.* Portsmouth, NH: Center on Instruction.

Schiller, E., Wei, X., Thayer, S., Blackorby, J., Javitz, H., & Williamson, C. (2012). *A randomized controlled trial of the impact of the Fusion Reading intervention on reading achievement and motivation for adolescent struggling readers*. Menlo Park, CA: SRI International.

Soto, G., Solomon-Rice, P., & Caputo, M. (2009). Enhancing the personal narrative skills of elementary school-aged students who use AAC: The effectiveness of personal narrative intervention, *Journal of Communication Disorders, 42*(1), 43-57.

Souvignier, E., & Mokhlesgerami, J. (2006). Using self-regulation as a framework for implementing strategy instruction to foster reading comprehension. *Learning and Instruction,* 16, 57-71.

Special Education Guide. (2013). *Other health impairment*. Retrieved from https://www.specialeducationguide.com/disability-profiles/other-health-impairment/

Staubitz, J., Cartledge, G., Yurick, A., & Lo, Y. (2005). Repeated reading for students with emotional or behavioral disorders: Peer- and trainer-mediated instruction. *Behavioral Disorders, 31*(1), 51-64.

Tankersley, K. (2005). *Literacy strategies for grades 4-12: Reinforcing the threads of reading*. Alexandria, VA: Association for Supervision and Curriculum Development.

Therrien, W., Wickstrom, K., & Jones, K. (2006). Effect of a combined repeated reading and question generation intervention on reading achievement. *Learning Disabilities Research and Practice, 21*(2), 89-97.

Torgesen, J., Wagner, R., & Rashotte, C. (2012). *Test of word reading efficiency (TOWRE-2).* Austin, *TX*: *PRO-ED*.

Toste, J., Capin, P., & Vaughn, S. (2017). Multisyllabic word-reading instruction with and without motivational beliefs training for struggling readers in the upper elementary grades: A pilot investigation. *Elementary School Journal, 117*(4), 593-615.

University of Oregon. (2005). *Dynamic indicators of basic early literacy skills (DIBELS): Oral reading fluency (ORF).* Retrieved from http://dibels.uoregon.edu/ measures/orf.php

Vaughn, S., Gersten, R., & Chard, D. (2000). The underlying message in LD intervention research: Findings from research syntheses. *Exceptional Children, 67*(1), 99-114.

Vaughn, S., Mathes, P., Linan-Thompson, S., & Francis, J. (2005). Teaching English language learners at risk for reading disabilities to read: Putting research into practice. *Learning Disabilities Research and Practice, 20*(1), 58-67.

Wehmeyer, M., Palmer, S., Agran, M., Mithaug, E., & Martin, J. (2000). Promoting causal agency: The self-determination learning model of instruction. *Exceptional Children, 66*(4), 439-453.

Wiederholt, J., & Bryant, B. (2001). *GORT-4: Gray oral reading tests* (4th ed.). Austin, TX: Pro-Ed.

Wilkinson, G., & Robertson, G. (2006). *Wide range achievement test* (4th ed.). Lutz, FL: Psychological Assessment Resources.

William, K., Cassidy, J., & Samuel, J. (2001). *The Group Reading Assessment and Diagnostic Evaluation (GRADE)*. Upper Saddle River, NJ: Pearson Education.

Woodcock, W., McGrew, S., & Mather, N. (2001). *Woodcock-Johnson III Tests of Achievement*. Rolling Meadows, IL: Riverside Publishing.

Zentall, S., & Lee, J. (2012). A reading motivation intervention with differential outcomes for students at risk for reading disabilities, ADHD, and typical comparisons: "Clever is and clever does." *Learning Disability Quarterly, 35*(4), 248-259.

Zimmerman, B. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *American Educational Research Journal, 45*(1), 166-183.

Zimmerman, B., & Schunk, D. (2001). *Self-regulated learning and academic achievement: theoretical perspectives*. Mahwah, NJ: Lawrence Erlbaum Associates Publishers.