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## RAP: A READING COMPREHENSION STRATEGY FOR STUDENTS WITH LEARNING DISABILITIES

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RAP: A READING COMPREHENSION STRATEGY FOR STUDENTS WITH  
LEARNING DISABILITIES

by

Courtney Blume

A THESIS

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RAP-A READING COMPREHENSION STRATEGY FOR STUDENTS WITH  
LEARNING DISABILITIES

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University of Nebraska, 2010

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Students with learning disabilities frequently struggle with reading comprehension. The purpose of this study was to investigate the efficacy of a paraphrasing cognitive strategy, RAP, on reading comprehension and the maintenance effects two months after treatment for students with learning disabilities. RAP was taught using the Strategic Intervention Model (SIM) developed by the University of Kansas Center for Research on Learning (Schumaker, Deshler, & Ellis, 1986). This study utilized a multiple baseline design across participants for three fourth grade students with learning disabilities from the Midwest. In addition to a learning disability, two of the students also had speech-language impairments while the other student was diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). Results indicated the use of RAP had a positive effect on reading comprehension with the most substantial gains for inferential comprehension questions. Two months after intervention, all three students either maintained gains in reading comprehension from baseline or continued to improve their reading comprehension during maintenance.

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## CHAPTER 1

### Introduction

Students with learning disabilities (LD) have experienced academic problems in math, writing, expressive and receptive language, and reading (Hallahan, Lloyd, Kauffman, Weiss, Martinez, 2005). They also have difficulties with information processing (Martin, Martin, & Carvalho, 2008). Information processing includes short-term memory, working memory, and metacognitive processes, which includes problem-solving skills, strategy selection, and monitoring one's performance. Compared to their non-disabled peers, students with LD have deficiencies in all three components for information processing (Hallahan et al., 2005). Learning disabilities can affect more than academic performance. Students with LD have lower academic self-efficacy, less hope for learning, and increased levels of loneliness compared to students without LD (Lackaye & Margalit, 2008).

The most common type of learning disability is in the area of reading (Hallahan et al., 2005). Typical difficulties in the area of reading include phonological processing, decoding, fluency, and comprehension (Eisenmajer, Ross, & Pratt, 2005; Hallahan et al., 2005). In addition to these problems, students with LD do not develop their own reading strategies, especially in the area of reading comprehension, and do not know how to adjust their reading to aid comprehension (Antoniou & Souvignier, 2007)

For the last 20 years, direct instruction and whole language have been the basis of classroom reading instruction for students with LD (Martin, Martin, & Carvalho, 2008). Direct instruction is intense and explicit when teaching reading skills and is delivered over a period of time to assist in generalization (Swanson, 1999). Direct instruction

consists of several demonstrations and examples which are then followed up with student practice while a teacher provides guidance and feedback. Direct instruction starts with phonemic awareness, then examines the relationship between words and meaning, and lastly examines sentences and paragraphs to obtain meaning (Martin, et al., 2008).

As compared to direct instruction, the whole language approach is child-directed that uses little explicit teaching. Rather, it focuses on literacy development through text exposure and linking together classroom experiences, life experiences, and background knowledge (Brooks-Harper & Shelton, 2003). Whole language is based on the notion that literacy develops naturally as language does.

Both direct instruction and the whole language approach have disadvantages. Direct instruction lacks in recent literature base because most of the research was conducted in the 1980s and earlier (Ross, et al., 2004). There is minimal recent research conducted on direct instruction and what results exist are mixed (Swanson, 2001). The whole language approach lacks instruction for reading deficiencies that students with LD will more than likely experience. (Martin, et al., 2008). Specifically, if students do not have a vast amount of background knowledge, the whole language approach cannot be as useful.

Based on the disadvantages of direct instruction and the whole language approach, there is another instructional technique that may be more effective for students with LD. The approach is cognitive strategy instruction. Cognitive strategy instruction has advantages over direct instruction and whole language. First, it has an extensive research base for many academic areas, including reading comprehension (Lenz, 2006; Reid & Lienemann, 2006). Second, cognitive strategy instruction explicitly teaches

students with LD to monitor their own reading comprehension through reading strategies which is a lacking skill for students with LD (Antoniou & Souvignier, 2007). Third, there are a variety of cognitive strategies, such as questioning, summarizing, mental imagery, story grammar, paraphrasing and reciprocal teaching, that can be used to improve reading comprehension so individual student needs are met (Pressley & Woloshyn, 1995).

Cognitive strategies have been used successfully to teach a variety of academic content to both students with and without LD for over 20 years (Lenz, 2006; Reid & Lienemann, 2006). A meta-analytic review of educational interventions for students with LD was conducted by Swanson and Sachse-Lee (2000). They found cognitive strategies were more effective than direct instruction across a wide array of content, including reading, math, spelling, and social studies. Also, cognitive strategy instruction has improved reading comprehension, math concepts, and math problem solving for students with LD ranging from fourth grade to seventh grade (Peat, Wilgosh, & Mulcahy, 1996). It has also been effective for these students when implemented in general education settings (Baker, Gersten, & Scalon, 2002).

In 2002, The Office of Special Education Programs convened a panel of researchers, special educators, and family members of students with disabilities to examine issues students with LD experience trying to learn general education curriculum. The panel stressed the importance of helping these students learn fundamental reading skills through the use of cognitive strategies (Baker et al., 2002). Considering only 33% of our nation's fourth graders read proficiently at grade level, it is vital that effective interventions are developed and implemented for all students, especially those with LD

(National Center for Educational Statistics, 2007). One important component of reading is reading comprehension which can be improved through the use of cognitive strategies.

A review of research in cognitive strategies and reading comprehension conducted by Faggella-Luby and Deshler (2008) found consistent improvements in reading comprehension for both elementary and secondary students with LD. Consequently, it should come as no surprise that cognitive strategy instruction is one of the most highly effective teaching methods for improving these students' reading comprehension and communication-language skills (Swanson & Carson, 1996). Also, the No Child Left Behind (NCLB) Act of 2001 included cognitive strategies as a major component of reading instruction (Lenz, 2006). However, the National Reading Panel (2000) reported that more research is needed to determine which type of cognitive strategies produce the best results for students of different age groups. In this regard, it is important to identify different models for delivering strategy instruction correctly and comprehensively.

One model that is used to teach a variety of cognitive strategies to students is the Strategic Intervention Model (SIM) developed at the University of Kansas Center for Research on Learning (Schumaker, Deshler, & Ellis, 1986). Its purpose is to help struggling students become better readers, writers, and overall learners by developing important strategies that can be used in a variety of academic areas. The SIM is based on research demonstrating that explicit and intensive instruction with the correct supports is vital to student success in a variety of school and out-of-school situations (Deshler & Lenz, 1989). The model contains eight steps that educators should follow when teaching a cognitive strategy: (a) Pretest and make commitments, (b) strategy description, (c)

modeling the strategy, (d) verbal practice, (e) controlled practice and feedback, (f) advanced practice and feedback, (g) posttest and commitment to generalize, and (h) generalization (Ellis, Deshler, Lenz, Schumaker, & Clark, 1991).

One specific cognitive strategy that has been taught to students with learning disabilities using the SIM is a paraphrasing strategy, that consists of three steps: (a) Read a paragraph, (b) Ask myself, “What is the main idea and two details?” and (c) Put the main idea in my own words (Schumaker, Denton, & Deschler, 1984). The acronym RAP, corresponding to the three components, has been used to describe this strategy. The purpose of RAP is to aid reading comprehension by helping students find the most important information in a given reading selection. This strategy, as well as the SIM, was developed at the Center for Research on Learning at the University of Kansas. Schumaker et al. (1984) found that students improved their reading comprehension 36% after learning RAP. It also has been effective for increasing reading skills for adolescents in middle school and high school with and without LD (Ellis & Graves, 1990; Hagaman & Reid, 2008; Katims & Harris, 1997; Lauterbach & Bender, 1995; Lee & Von Colln, 2003). However, no study to date has investigated the efficacy of RAP for improving the reading skills of elementary-level students with disabilities.

Therefore, the purpose of this study is to add to the literature by extending RAP down to students with LD in elementary schools. Reading skills are necessary for all students to acquire if they are to succeed in school. Furthermore, reading skills are developed early in children’s elementary education. Difficulties in this area, if not addressed, can exacerbate problems learning later in school. If RAP can be effective for

elementary aged students, it may prevent the later need for more intensive reading remediation.

## CHAPTER 2

### Literature Review

This chapter contains a review of studies using RAP as a reading comprehension strategy and its effectiveness for students answering comprehension questions and/or retelling reading passages. Studies were gathered by searching the PsychInfo database and the Academic Search Premier database. The following search terms were used: reading comprehension, students with learning disabilities, cognitive strategy instruction, RAP, paraphrasing strategy. The search began in the year 1984 when the SIM and RAP were developed by Deschler, Schumaker, and their colleagues at the University of Kansas Center for Research on Learning. Only articles appearing in referenced journals were obtained. A search of the references in these articles was completed to identify any possible additional articles. Finally, the titles of articles for the past 10 years appearing in the following journals were scanned to ensure full coverage: *Journal of Learning Disabilities*, *Learning Disability Quarterly*, *Learning Disabilities -- A Contemporary Journal*, and *Learning Disabilities Research and Practice*.

A total of five studies were attained: two using group designs (Ellis & Graves, 1990; Katims & Harris, 1997) and three using single subject designs (Hagaman & Reid, 2008; Lauterbach & Bender, 1995; Lee & Von Colln, 2003). All five studies used adolescent participants-some with LD and some without LD. Overall, the studies produced positive results.

#### *Group Design Studies*

Group design studies have more participants compared to single subject designs. This can be an advantage as group design studies are more representative of the

population and they allow researchers to assess statistically significant differences. However, group design studies also have disadvantages. Group design studies can assume that an intervention will have the same effect on all children. Also, group design studies do not allow for continuous individual assessment which can produce meaningful changes for student learning.

*Ellis and Graves (1990)*. Ellis and Graves (1990) conducted a study on the efficacy of RAP using 47 middle school students in grades five through seven. Thirty-five students were male and 12 students were female. Students' ages ranged from 10 years, eight months to 13 years, nine months and their mean age was 12 years, two months. All participants were identified with a learning disability. In order to be a participant, students had to be identified with a learning disability, read third grade material with 97% accuracy, read at least 100 words per minute, and score 60% or lower on comprehension tests taken from *Reading for Concepts, Level C*. All of the participants scored a minimum of 85 on the Wechsler Intelligence Scale for Children—Revised (WISC-R) and scored two years or more below grade level on the reading comprehension subtest of the *Peabody Individual Achievement Test* with a minimum of a 15-point standard score discrepancy between achievement and ability.

The setting was not described in this study. Consequently, it is unknown if instruction took place in a special education or general education classroom.

There were four training conditions in this study: control, repeated readings (RR), paraphrasing strategy instruction (PSI), and paraphrasing strategy instruction plus repeated readings (PSI +RR). The condition PSI represented the RAP strategy. All four conditions had several similarities. First, all participants were told the given instruction

could improve reading comprehension. Second, modeling, prompted practice, and corrective feedback were common instructional techniques. Third, the reading selections of similar lengths were randomly assigned and participants were allowed 12 minutes to read and apply the instructional technique. For the first four days of training, participants selected main ideas from multiple-choice items. For the second four days of training, participants were required to produce main ideas. Fourth, all students were given one practice story during the first two days of training and two stories per day for practice after the first two days. Finally, the training items for the first four days were similar to items used in *Reading for Concepts, Level C*.

The dependent measure in this study was the identification of the main idea of a collection of stories taken from *Reading for Concepts, Book C*. However, the results were based on a score from the multiple-choice test. Specifically, a ten item multiple-choice test accompanied each story. A pretest was given before instruction was administered. A test was given following the first and second set of practice sessions. A maintenance test was given two weeks after the second test.

RAP was taught in six sessions. Session length was not stated. The first two training sessions were used to define, describe, and model the steps of RAP. Students were then asked to verbally rehearse the steps until they were committed to memory with 100% accuracy. The following four sessions consisted of RAP practice using stories from *Reading for Concepts, Book C* and grade level science textbooks. Corrective feedback was given during these sessions.

The results of the study demonstrated that RAP instruction produced the best results for improving reading comprehension. Significant differences were found

between the effects of RAP compared to the effects of repeated reading instruction and the control condition. No significant differences were found between the effects of RAP compared to the effects of RAP with repeated readings which illustrates that pairing repeated readings with RAP is no more effective than teaching RAP in isolation. A maintenance check was conducted fourteen days after the second test. Although it was not discussed, it appears that positive effects of RAP were maintained.

This study contained some limitations. First, the length of training sessions was not addressed so it is unknown exactly how much time it took for the students to learn and apply RAP. The study did not state whether the instruction took place in a special education or general education classroom. Also, it did not state who conducted the training so it is unknown if it was implemented by a teacher or a researcher. Finally, only one maintenance check was conducted which was 14 days after the second test. It is unknown if positive treatment effects were maintained past 14 days.

*Katims and Harris (1997).* Katims and Harris (1997) used RAP in inclusive classrooms with 207 students in seventh grade. The study did not include gender or ages of the participants. Out of 207 students, 25 of the students were identified with a learning disability. Out of these 25 students, 15 were male and 10 were female. Ten reading classes of seventh grade students were selected for this study. Students were given a reading pretest. Anyone who did not finish the test or scored above 90% was excluded. The remaining students were selected as participants. The mean IQ of the students with LD was 96 and the mean IQ of non-identified students was understood to be in the average range.

The study took place in inclusive reading classrooms which were either control classes or experimental classes. The reading classes were part of a block schedule in which they met for 90 minutes every other day. All students in the control or experimental reading classes were receiving the same core reading instruction.

The study consisted of two training conditions, a control group and an experimental group. Participants were randomly assigned to either group. The control classes continued to receive instruction from the district-wide reading program called Reading Workshop. Reading Workshop consists of three parts: reading, responses, and mini-lessons. During the reading section of Reading Workshop, participants either read silently or listen to the teacher read aloud. During responses, they were asked to orally respond or respond in writing to what they just read. This process included summarizing and student reactions to the reading materials aided by word webs, graphic organizers, and compare/contrast charts. During mini-lessons, direct instruction was given on a specific topic using authentic text for no more than ten minutes. The experimental group continued with Reading Workshop using the same reading materials, but received RAP instruction in addition.

The dependent measure in this study was the post-test score consisting of ten multiple-choice questions taken from *Timed Readings* (Spargo, 1989). A one-way Analysis of Covariance was performed on students' post-test scores with their pretest scores to determine the effects of RAP on test performance.

Training sessions for the experimental group lasted 20 minutes every other school day. These training sessions continued for six school weeks equaling 15 training sessions. The RAP instruction was conducted by the teacher in the reading classroom.

The training procedures were a slightly modified version of SIM. During the first training session, all of the participants, including the control group, were given a pretest consisting of ten multiple-choice questions from *Timed Readings* (Spargo, 1989). Following the pretest, students in the experimental group were asked to commit to learning RAP. The next step included describing and modeling the strategy using meta-cognitive statements for two sessions. The following steps spanned 11 sessions. The students memorized the strategy and rehearsed finding the main idea of a paragraph and stating the main idea and details. Next, participants continued to practice RAP with fourth, fifth, and sixth grade passages with teacher prompting in addition to answering multiple-choice questions about the passage. Corrective feedback was given. Participants subsequently kept practicing RAP and answering multiple-choice questions, but with grade level passages from *Timed Readings* and less prompting from the teacher. Corrective feedback was still provided. Finally, participants completed a post-test during the 15th session.

The results confirmed that students with LD in the experimental group receiving RAP instruction increased their scores more from pre-test to post-test than students with LD who were in the control group. Students with LD in the experimental group receiving RAP instruction gained 22% on their comprehension scores as compared to an 11% gain for students with LD in the control group. RAP also proved to be an effective strategy to use with non-disabled students as well. Non-disabled students in the experimental group gained 17% from pre-test to post-test as compared to the 3.5% gain of students in the control group. When the control group and experimental group were compared, there

was a significant effect on reading comprehension scores at post-test for the experimental group.

One limitation of this study is whether treatment effects were maintained. Maintenance checks were not conducted to determine if the students' gains were sustained. Also, participants met every other day to receive instruction due to block scheduling. Because instruction and RAP practice did not occur every day, results may not have been as meaningful.

### *Single Subject Designs*

Single-subject designs are used in educational research due to two advantages. First, they allow researchers to visually analyze and determine if an intervention is effective for one participant or a small group of participants. This allows for treatment that is more effective based on an individual's progress because treatment can be changed if positive effects are not occurring. Second, single-subject designs allow more control over treatment and outcome variables (Zhan & Ottenbacher, 2001). The following research studies use ABAB and multiple-baseline designs.

*RAP instruction with high school freshmen.* Lauterbach and Bender (1995) conducted a study using RAP with three high school freshmen. All three students were male, but their ages were not specified. Two students had learning disabilities and one student had a mild intellectual disability (i.e., IQ between 55 to 70 with deficiencies in adaptive behavior). Participants were selected by teacher interviews indicating reading comprehension was a significant problem for all three students who were reading two years below grade level. Data were not given about achievement and intelligence scores for the participants.

Participants spent between 60% to 85% of the school day in the resource room. However, when and where the training sessions took place was not reported.

A multiple baseline design with an embedded changing criterion was used. The criterion was once students obtained 80% for paraphrasing and 70% for comprehension on a certain grade level passage, the reading passage increased by one grade level. This criteria used to determine success remained the same across phases. Each phase, except baseline and maintenance probes, corresponded to a one-grade level increase in reading achievement.

The dependent measures in this study included percent correct for paraphrasing and percent correct on the comprehension tests. Also, participants' usage of the strategy and their opinion on the importance of using RAP was examined through a series of interview questions. The following criteria was used to determine the paraphrasing score: One point was given for identifying the main idea of a paragraph and one point was given for each appropriate detail, but no points were given for more than two details. To receive points, the paraphrase had to be a complete thought with a subject and verb, be correct, make sense, contain useful information, be in the student's own words, have only one general statement, and could not be a repetition of previously stated ideas. For a five paragraph reading passage, 15 points was the highest score that could be earned. To determine percent correct on comprehension, the number of correct answers on multiple-choice comprehension questions was divided by the total number of questions.

There were between nine to 12 training sessions although session length was not reported. Training was conducted by a practitioner who was not involved with the development of the school's curriculum. This study was broken down into three phases.

Phase one consisted of three to five sessions in which RAP was introduced, described, modeled, and memorized. During Phase two, which consisted of three to four sessions, participants practiced RAP with reading passages while using a cue card of the steps and receiving corrective and specific feedback of their performance. After reading the passage, they paraphrased what they read and completed a ten problem multiple-choice test on the next day. Phase three consisted of three sessions: (a) participants continued to rehearse RAP, (b) paraphrased what they read, and (c) completed a ten problem multiple-choice test on the following day. During this phase, cue cards were eliminated. When participants reached 70% correct for comprehension and 80% for paraphrasing on a certain grade level passage, the passages increased by one grade level. A final post-test was given after phase three. Finally, three maintenance probes were administered, which appeared to occur in three consecutive sessions following the post-test.

Results showed an increase in paraphrasing across increasing grade level material. All three participants had baseline scores of 53% for paraphrasing and increased to between 86% to 88% during phase three. The participant with the mild intellectual disability increased substantially in answering reading comprehension questions from a baseline percentage of 10% to 86% during phase three. The two participants with LD remained above 70% for reading comprehension during all phases. All participants were reading at a seventh grade level and increased their reading skills to a ninth grade level using the criterion of 70% accuracy for comprehension and 80% for paraphrasing. Based on the interviews, participants found the strategy useful and were able to generalize it to other courses (e.g. they were able to read faster and understand more of the material). All participants maintained treatment effects.

This study contains some methodological issues and limitations. First, the length of the training sessions was never stated so it is unknown if implementing RAP took 30 minutes per training session or longer per session. This information is important to support RAP as a time efficient strategy. Second, three probes were used as maintenance data. However, these three probes appear to have been done right after phase three and the study does not specify when these probes occurred to determine the long-term effects of RAP.

*RAP instruction with a sixth grade boy.* Lee and Von Colln (2003) conducted a study evaluating the efficacy of RAP with a 12-year old boy in sixth grade. The participant did not have a disability, but was referred to the school's student assistance team (SAT) by his mother due to his low reading skills. Prior to the study, the student had near grade level word identification skills and reading comprehension skills at mid-third grade level according to the Woodcock-Johnson Psycho-Educational Battery-Revised: Tests of Achievement (WJ-R). The setting of the training sessions was not addressed, although they took place during the school hours. One-on-one instruction was provided.

A single-case reversal experimental design was used. The reversal was administered early in the instruction of RAP to demonstrate the controlling effects of RAP.

Dependent measures included the paraphrasing score, comprehension score on ten open-ended questions, reading accuracy, and reading fluency. The paraphrasing score was determined by assigning one point for identifying the main idea of a paragraph and one point for each appropriate detail, but no points were given for more than two details.

To receive the points, the paraphrase had to be a complete thought with a subject and verb, be correct, make sense, contain useful information, be in the student's own words, have only one general statement, and could not be a repetition of previously stated ideas. For a five paragraph reading passage, 15 points was the highest score that could be earned. The comprehension test included ten open-ended questions containing 60% knowledge questions, 20% comprehension questions, 10% analysis questions, and 10% synthesis questions. Accuracy was determined with fifth grade curriculum containing 250 words. The participant read these words for one minute to determine fluency.

There were nine training sessions lasting between 30 to 45 minutes. Training was conducted by the authors of the study, not a teacher. The authors used the SIM to teach RAP. During baseline, the participant was given two fifth grade level passages. On the first passage, he read for one minute to measure fluency and accuracy. He was then given a second passage containing five paragraphs to read. After reading each paragraph, he was asked to paraphrase what he read and complete a comprehension test. Baseline data were collected for eight days over a three-week period. During phase B<sup>1</sup>, RAP was implemented with cue cards containing its steps which were modeled and memorized by the participant over a two-day period. The strategy was then rehearsed with grade level and instructional reading materials consisting of five paragraphs followed by specific and corrective feedback. Afterwards, the participant paraphrased each paragraph and was given a comprehension test the following day. The next step was phase A<sup>2</sup> (reversal) and the same procedures were followed as during the initial baseline. During phase B<sup>2</sup>, the participant continued to rehearse the use of RAP with instructional and grade level reading materials with fewer prompts and without the use of a cue card. Similar to phase

phase B<sup>1</sup>, the participant also paraphrased each paragraph immediately and completed a comprehension test on the following day. Phase B<sup>2</sup> took place during five consecutive days of instruction in one week and two more consecutive days in the next week. During all phases, reading fluency and accuracy were monitored with 5<sup>th</sup> grade curriculum based measurements that were different from the passages the student was expected to paraphrase.

Results indicated that the participant's reading comprehension scores, paraphrasing scores, and reading rate improved with RAP. There were no positive effects for reading accuracy. The participant's reading comprehension score on the open-ended comprehension test improved from a mean of 44% during baseline to 68% after phase two. Paraphrasing scores improved from 45.2 total points during baseline to 79.6 total points after phase two. During baseline, the participant's mean reading rate was 111.8 and improved to 127.8 after phase two.

One weak point of the study includes the authors' decision to use a reversal design because it is impossible to undo learning once the instruction is removed (Maag, 2004). The study did state that the selected reading passages came from the school's reading series, but did not offer information whether the passages were fiction or non-fiction or if they increased in difficulty. Finally, this study did not collect data to determine if gains were maintained.

*RAP instruction with sixth grade girls.* Hagaman and Reid (2008) conducted a study on the effectiveness of RAP using three middle school students in sixth grade. Participants were all females: two who were 12 years old and one who was 13 years old. Participants were not identified with any disability at the time of the study. However,

one participant was identified with a speech-language impairment in second grade and was dismissed in third grade. Participants were selected based on three criteria: (a) scoring at least one year below grade level on vocabulary, comprehension, and total score from the Gates-Macginitie Reading Test-4 (GMRT-4); (b) teacher interviews identifying students who struggled with reading comprehension within the Reading Enrichment program; and (c) scoring below the 25<sup>th</sup> percentile on comprehension on the Gray Oral Reading Test, Fourth Edition (GORT-4) and scoring at or above the 50<sup>th</sup> percentile on fluency. One participant scored in the 16<sup>th</sup> percentile for comprehension and 75<sup>th</sup> in fluency, a second scored in the 25<sup>th</sup> percentile for comprehension and 84<sup>th</sup> percentile for fluency, and the last scored in the 5<sup>th</sup> percentile for comprehension and 75<sup>th</sup> percentile for fluency.

All instruction in this study occurred in a school hallway outside of a Reading Enrichment classroom in the afternoon. The Reading Enrichment class gave additional instruction for struggling readers in the areas of word recognition, fluency, and decoding in addition to the reading curriculum. A special education teacher and general education teacher co-taught Reading Enrichment. When not receiving RAP instruction, the students were in Reading Enrichment class.

A multiple baseline design across participants was employed. Multiple baseline probes were given. Each participant received RAP instruction at different times. While one student was in intervention phase, the other two students were either in baseline or maintenance.

The dependent measures included percentage of text recalled and correct responses on six short-answer questions. To measure percentage of text recalled, a

checklist of information from each reading passage was created in a similar fashion to the Qualitative Reading Inventory-3 (QRI-3). The retelling checklist included the main idea from each paragraph and related details. Participants were given credit for every recalled main idea and related details. They received credit for exact word call or synonymous words and phrases that matched the main idea and details from each paragraph. This information was converted to percentages. Short-answer questions included three text-implicit and three text-explicit questions. All questions were answered orally. These questions were developed by the authors of the study based on important information in each reading passage.

Each training sessions lasted 30 minutes. Training was conducted by one of the authors of the study. Participants received four to five training sessions based on individual need. During baseline, participants were asked to read aloud fourth grade level social studies selections. They were also given assistance with any unknown words as they read aloud. After reading the selection, participants were asked to retell the passage and orally answer six questions about what they read. There were at least three baseline probes per participant that were conducted until a stable trend was established. Each participant was given RAP instruction until they reached the criterion level of independently reading a passage and using RAP without teacher prompts by identifying the main idea and details for each paragraph. Two participants reached criterion in four training sessions while one required five training sessions to reach criterion. Instruction for using RAP consisted of several steps using the Self-Regulated Strategy Development Model (SRSD): (a) develop background knowledge, (b) discuss the strategy, (c) model the strategy, (d) support the strategy, and (e) independent performance. During the

second step of training, “discuss the strategy,” each participant set a goal with their teacher about their performance on percentage of text recall. Participants were instructed to record their performance on a graph so they could self-monitor progress towards their goal. Four probes were given after instruction using the same directions as baseline and one maintenance probe was given two weeks later.

All participants improved in percentage of text recalled and accuracy when answering comprehension questions after receiving RAP instruction. Treatment effects for percentage of text recalled and mean scores on short answer questions were maintained after two weeks.

One limitation of the study was that only one maintenance probe was administered two weeks after RAP intervention ended. Because the maintenance period was only two weeks later, it is unknown what the long-term effects and benefits of RAP may be for students who struggle with reading. Another limitation was that RAP and self-regulation interventions were used together during treatment. Consequently, it is impossible to determine if RAP instruction or goal setting used in combination with self-monitoring produced the positive effects.

### *Conclusions*

There were similarities and differences in the studies reviewed. One important similarity is all five studies produced positive results indicating RAP is an effective strategy for reading comprehension. Each study also measured reading comprehension through either multiple-choice or open-ended questions. In addition, three studies also measured paraphrasing or story recall (Hagaman & Reid, 2008; Lauterbach & Bender, 1995; Lee & Von Colln, 2003). All of the studies included students with reading

comprehension struggles while three studies closely examined students with disabilities, primarily learning disabilities (Ellis & Graves, 1990; Katims & Harris, 1997; Lauterbach & Bender, 1995). Out of the five studies, four included participants in middle school ranging from grade five to grade seven (Ellis & Graves, 1990; Hagaman & Reid, 2008; Katims & Harris, 1997; Lee & Von Colln, 2003) and one study focused on high school freshmen (Lauterbach & Bender, 1995). Three of the studies had three or fewer participants (Hagaman & Reid, 2008; Lauterbach & Bender, 1995; Lee & Von Colln, 2003) while two had 47 participants and 207 participants, respectively (Ellis & Graves, 1990; Katims & Harris, 1997). Two studies took four to six training sessions for RAP instruction (Ellis & Graves, 1990; Hagaman & Reid, 2008) while the remaining three studies took anywhere from nine to 15 training sessions (Katims & Harris, 1997; Lauterbach & Bender, 1995; Lee & Von Colln, 2003). Training session length ranged from 20 minutes to 45 minutes for three studies (Hagaman & Reid, 2008; Katims & Harris, 1997; Lee & Von Colln, 2003) while two had unknown training session length (Ellis & Graves, 1990; Lauterbach & Bender, 1995). Four studies used SIM or procedures similar to SIM to instruct students in RAP (Ellis & Graves, 1990; Katims & Harris, 1997; Lauterbach & Bender, 1995; Lee & Von Colln, 2003) while one study used SRSD to implement RAP (Hagaman & Reid, 2008). Only one study was conducted in an inclusive classroom (Katims & Harris, 1997). Three studies followed up with maintenance probes with the longest maintenance period being two weeks (Ellis & Graves, 1990; Hagaman & Reid, 2008; Lauterbach & Bender, 1995).

After analyzing these similarities and differences, two gaps in the research stood out. First, none of the studies utilized RAP with elementary students with LD. Second,

only three of the studies provided maintenance checks after RAP instruction was delivered (Ellis & Graves, 1990; Hagaman & Reid, 2008; Lauterbach & Bender, 1995). However, the maintenance periods lasted only up to two weeks after RAP intervention ended. A research synthesis conducted by Gajria, Jitendra, Sood, & Sacks (2007) found positive effects for students with learning disabilities in reading comprehension after receiving instruction in cognitive strategies. However, there was a lack of research studies that examined the maintenance effects after receiving cognitive strategy instruction. In order to fully understand the effectiveness of RAP, research needs to be conducted with students with learning disabilities in elementary school to determine if positive gains can be made in reading comprehension. Also, more research needs to be completed in the area of maintenance to determine if RAP continues to produce positive treatment effects for reading comprehension after RAP instruction has been discontinued. Therefore, the purpose of the present study was based on the following questions:

- 1) What are the effects of RAP on the comprehension scores of elementary students with learning disabilities?
- 2) What are the maintenance effects of RAP at one and two months after treatment?

## CHAPTER 3

### Methods

#### *Participants*

All of the participants were fourth grade students. The participants were selected based on the following criteria: performance below the 60<sup>th</sup> percentile on the reading comprehension section of the Iowa Test of Basic Skills which was completed at the end of third grade, teacher nomination based on past anecdotal data regarding reading comprehension performance gathered by the speech pathologist and classroom teachers, and performance on Leveled Reading Passages that was at least one semester behind grade level. The school district assesses the reading skills of students using Leveled Reading Passages developed by Houghton Mifflin. These assessments measure reading accuracy, fluency, and comprehension. These passages are coded with letters that correspond to certain grade levels.

*Molly.* Molly was 9 years, 9 months old. She qualified as having a learning disability through standardized academic and ability assessments that determined she met the state eligibility discrepancy criteria as a student with learning disability (i.e., she obtained average to high average ability scores, with below average achievement scores that were at least 20 points below her IQ). Molly also qualified as a student with a speech-language impairment in the area of language. She experienced difficulties with both receptive and expressive language. After taking the Iowa Test of Basic Skills, her vocabulary score was in the 92<sup>nd</sup> percentile, her reading comprehension score was in the 57<sup>th</sup> percentile, and her total reading score was in the 76<sup>th</sup> percentile. At the beginning of fourth grade, Molly was able to correctly answer comprehension questions over grade

level reading material 40% of the time according to probes conducted by the speech pathologist. At the beginning of fourth grade, Molly passed a Leveled Reading Passage OP, which is equivalent to late third grade reading material. Her classroom teachers, past special education teacher, and speech pathologist all define Molly's reading comprehension performance as inconsistent. Past examples of her inconsistent reading comprehension performance include: (a) receiving an 80% or above on a reading comprehension worksheet or test on one occasion and receiving less than 50% on another similar worksheet or test on the same story, (b) retelling one story in its entirety, but not able to retell another similar story even with the same amount of background knowledge on both stories (c) answering oral comprehension questions with 80% accuracy about one story, but then answers oral comprehension questions about another story with less than 50% accuracy.

*Edward.* Edward was also in fourth grade and was 9 years, 11 months old. Edward qualified with a learning disability based on the same criteria as Molly and also qualified as a student with a speech-language impairment. Edward struggled in the area of expressive language. After taking the Iowa Test of Basic Skills, his vocabulary score was in the 30<sup>th</sup> percentile, his reading comprehension score was in the 29<sup>th</sup> percentile, and his total reading score was in the 30<sup>th</sup> percentile. When given third grade reading passages by the speech pathologist at the beginning of this year, Edward was able to answer inferential comprehension questions 14% of the time. At the start of fourth grade, Edward passed a Leveled Reading Passage MN, which is the equivalent of beginning third grade reading material.

*Shane.* Shane was in fourth grade and was 9 years, 3 months old. He qualified as a student with a learning disability through the Response to Intervention (RtI) process (i.e., he performed below the 12<sup>th</sup> percentile on district norms after 16 weeks of intense reading intervention). His primary identification is Other Health Impairment (OHI) due to his medical diagnosis of Attention Deficit Hyperactivity Disorder (ADHD). He was diagnosed by a pediatrician and took medication for his symptoms associated with ADHD. Shane's behaviors in a classroom setting have been interfering with his academic growth and performance according to his classroom teacher. He walked around the classroom, talked out of turn during instruction, touched objects around him (e.g., his pencil, paper, and clothes), and talked about other topics while completing academic tasks. After taking the Iowa Test of Basic Skills, his vocabulary score was in the 41<sup>st</sup> percentile, his reading comprehension score was in the 34<sup>th</sup> percentile, and his total reading score was in the 38<sup>th</sup> percentile. At the beginning of fourth grade, Shane passed a Leveled Reading Passage MN, which is the equivalent to beginning third grade reading material.

### *Setting*

This study was conducted during the first two quarters of the 2009-2010 school year at an elementary school in the mid-west. The study began on September 1<sup>st</sup>, 2009 and concluded on December 16<sup>th</sup>, 2009. The population of the school included 491 students with 6% minority, 10% gifted, 15% placed in special education, and 20% eligible for free/reduced lunch.

All instruction took place in the morning in a resource room during reading group. The RAP procedure was implemented by a special education teacher using a one-on-one

format. Sessions lasted between 25 and 30 minutes. The RAP intervention lasted seven to nine sessions depending on how long it took each participant to be able to use RAP without any teacher prompts. During RAP instruction, other students who were not participating in the study received reading instruction in a small group format delivered by a student teacher. The resource room is 22 feet by 35 feet and has one kidney-shaped table on the north and south side of the room with two trapezoid tables located in the center of the room. RAP instruction took place at one kidney-shaped table while the other students were at the other kidney-shaped table. The distance between the two kidney-shaped tables was 20 feet.

#### *Dependent Measures*

Two dependent measures were collected throughout this study: (a) percentage correct of literal questions and (b) percentage correct of inferential questions. Each probe contained five literal questions and five inferential questions. To determine the percentage correct for each type of question, the number of correct responses was divided by the total number of questions. Data were collected during all phases of the study. The assessment used during this study was *Timed Readings Plus Book One* (Spargo, 1998). Book One is equivalent to fourth grade reading material. This text was chosen for a variety of reasons. First, *Timed Readings* was utilized during a previous study about RAP conducted by Katims and Harris (1997). Also, this book contained expository reading passages and questions that are similar to reading activities and tests the students are asked to complete during the school day and school year. Many of the passages children read at school are expository text, yet learning how to comprehend expository text is highly ignored in elementary schools' curriculum (Williams, Hall, & Lauer, 2004).

*Timed Readings Plus Book One* provided an answer key for each probe of ten multiple-choice questions. After the experimenter scored each probe, a special education teacher also checked each probe. Interrater reliability was 100%.

### *Experimental Design*

A multiple baseline design was used across participants. This design required some participants to remain in baseline while others were being taught RAP. Repeated measurements were carried out across comprehension assessments initially to obtain baselines on all participants. Repeated measurements across participants continued while treatment was introduced sequentially across participants, but never concurrently. When one child was receiving treatment, the other participants were under either baseline or maintenance conditions. Once treatment was terminated for a certain participant, subsequent maintenance checks through use of the probes were collected for two months.

### *RAP Strategy*

RAP was taught using the SIM which was developed by the University of Kansas Center for Research on Learning. The following steps of SIM and how it was used in this study are described. RAP was taught using one-on-one instruction.

1. *Pretest and make commitments.* Participants were pre-tested during baseline phases. They were asked to read a passage and then answer ten comprehension questions pertaining to the passage. After baseline data was obtained, participants were asked if they were ready to commit to learning RAP as a “trick” to improve their reading comprehension. All three students agreed.

2. *Describe the strategy.* During this stage, the teacher described what RAP is used for, where it can be used, when it can be used, and why it should be used.

Participants were then told what each step of the RAP stood for:

R: Read a Paragraph.

A: Ask yourself what is the main idea and two details.

P: Put the main idea into your own words.

For example, the teacher described RAP by saying aloud:

*RAP is a strategy that can improve your reading comprehension and help you remember what you read. It can help you retell a story or answer questions about a story in class or on a test. Using RAP can help reading comprehension in many places at school, including reading class, guided reading, science, social studies, and health. You can also use RAP at home while you are reading. You should use RAP whenever you are reading and want to remember what you read. Using RAP can help you do better at school while reading. RAP stands for three steps. R stands for Read a Paragraph. A stands for Ask yourself what is the main idea and two details? P stands for Put the main idea into your own words.*

3. *Model the strategy.* In this stage, the teacher verbally modeled the strategy by performing a think-aloud about the steps of the strategy. During this think-aloud, the teacher modeled meta-cognitive statements including “What do I do next?” “What is the next step?” “What does it mean to put something into my own words?” For example, the teacher picked up a reading passage about spiders and modeled the steps of RAP by saying aloud the following:

*I have to read this passage. What strategy can I use to help me remember what I read? I know! I can use RAP. The first step of RAP is read a paragraph. My first step is to read a paragraph. Now that I read the paragraph, what do I do next? I need to move on to the next step of RAP which is A. A stands for ask myself what is the main idea and two details. The main idea of this paragraph was that spiders can be helpful to humans. Two details that support the main idea is spiders eat pests that can bother humans and that spiders only bite when bothered. What is the next step of RAP? The last step is P which means put the main idea into my own words. What does it mean to put something into my own words? It means I need to say the main idea in a way I can understand, but I can't use the exact same words as the book. The main idea in my own words is humans should not be as scared of spiders because spiders can help people.*

4. *Verbal practice.* The participants rehearsed and memorized the strategy to 100% accuracy during this stage. Memorization of 100% accuracy was determined when participants were able to verbally state all three steps of RAP without teacher prompts or using the cue card. All three students were able to memorize the steps of RAP after one session. The steps of RAP were memorized with verbal rehearsal, written rehearsal, and physical activity including throwing a ball back and forth while practicing saying each step of the strategy aloud. Also, participants rehearsed where to first look for a main idea of a paragraph, practiced how to find two details, and attempted putting main ideas into their own words. For example, the teacher modeled how to find a main idea of a paragraph using a think-aloud. The teacher said:

*When I look for the main idea I want to ask myself, ‘what’s the point of the paragraph?’ I know that the topic sentence of a paragraph sometimes is the main idea, so I am going to check to see if the first sentence of the paragraph is the main idea. If the topic sentence is not the main idea, then I know I need to keep looking through the paragraph to find what the paragraph is about.*

Also, they reviewed the difference between details and main ideas. The teacher modeled this by saying, “I know the main idea is the point of the paragraph or what the paragraph is about. Details are little pieces of information that support the main idea.” Finding main ideas and details was practiced with the teacher using passages from *Timed Readings Book One* (Spargo, 1998). After participants practiced finding the main idea and details of a paragraph, the teacher then modeled how to put main ideas into her own words. The teacher modeled aloud:

*Now that I found the main idea and supporting details, I need to put the main idea into my own words. That means I cannot say the main idea using the exact same words in the paragraph. I have to change some words and put the main idea into words that I understand.*

After additional modeling from the teacher, the participants then practiced putting the main idea into their own words with corrective feedback from the teacher. Once participants were able to read a paragraph and find the main idea, two details, and put the main idea into their own words, they moved on to controlled practice and feedback.

5. *Controlled practice and feedback.* The participants were instructed to read the grade-level passages aloud and use RAP for every paragraph. The grade-level passages were collected from *Timed Reading Plus Book One* (Spargo, 1998). The teacher and

participants practiced RAP together and assisted each other while using the strategy. For example,

TEACHER: Modeled RAP. Read a paragraph, then asked, “What should I do next?”

PARTICIPANT: “Ask yourself what is the main idea and two details.”

TEACHER: Stated the main idea of the paragraph, then said, “Could you help me find 2 details?”

PARTICIPANT. Reported 2 details.

TEACHER: Completed the last step of RAP and said, “How would you put the main idea into your own words?”

PARTICIPANT: Put the main idea into his/her own words, then used RAP with teacher prompting as needed.

Participants were also allowed to look at a prompt card that contained the steps of RAP. When every paragraph of the passage had been read and RAP had been used, participants then answered 10 multiple-choice questions about the passage. Corrective feedback was given while using RAP and while answering the 10 multiple-choice questions. An example of corrective feedback while using RAP would be reminding participants that when they needed to put the main idea into their own words instead of stating the main idea exactly as how it was written in the passage. Corrective feedback while answering the 10 multiple-choice questions included reminding students to think back about the main ideas and details while trying to find the correct answer.

6. *Advanced practice and feedback.* Participants continued to practice RAP in order to be able to use RAP independently. Independent use of RAP was determined when participants were able to correctly apply all the steps of RAP to a paragraph.

Teacher feedback was only given when needed. For example, when a participant was able to use the first two steps of RAP accurately and independently, but was not able to put the main idea into their own words that is when teacher feedback was given about putting the main idea into their own words. The teacher would say, “We are on the last step which is putting the main idea into your own words. Tell me how you would put the main idea into your own words without copying the exact words from the book. Then, I can help you.” The prompt card containing the steps of RAP was not used during this time.

7. *Posttest and commitment to generalize.* Participants were given their final probe. Also, participants were asked to use this strategy in the general education classroom. The participants were told, “I want you to use RAP in the classroom whenever you need to remember what you read. You can use RAP during reading class, guided reading groups, health, social studies, and science. During the week, I am going to ask you if you used RAP and for what subject.”

8. *Generalization.* Participants reported they used RAP in the general education classroom and for which subjects. The general education teachers were also informed about the new strategy so they could encourage the use of RAP in their classroom while students were reading.

### *Procedures*

*Baseline.* The order of participants in baseline was Molly, Edward, and Shane. The order was determined by teacher knowledge of the participants, including how quickly each participant could independently use the strategy based on past academic performance. It was determined that Molly and Shane would take the least amount of

time to learn and apply RAP, so Molly received instruction first and Shane received instruction last. Edward received instruction second since it appeared he would take the longest amount of time to be able to learn and apply RAP. Baseline consisted of at least five data points in an attempt to achieve a stable trend. First, each participant was probed with comprehension passages five times or more until a stable baseline was obtained. Stability was determined when a reasonable level and trend were noted which justifies a phase change (Hayes, et al., 1999). After the baseline phase, each student participated in a treatment phase. Phase changes between baseline and treatment were staggered between students. All students began the baseline phase at the same time.

Molly received treatment immediately after a stabilized baseline of five data points was obtained. Edward continued baseline until a reasonably clear intervention effect was noted in Molly. Similarly, Shane continued baseline until intervention effects were shown for both Molly and Edward. Each participant engaged in treatment before the next participant began the intervention to ensure that a reasonable effect had taken place during treatment while another participant's reading comprehension without the intervention was stable. This design demonstrated convincingly that the treatment effect was due to the intervention and not other factors.

Baseline data gathering occurred during September 1<sup>st</sup> through September 18<sup>th</sup>. During baseline, each student read five reading passages taken from *Timed Readings Plus Book One* (Spargo, 1998). Participants were asked to read each passage aloud. They were told they could ask the teacher for assistance on pronunciation of any unknown words, but there was not any additional assistance given including prompts or praise. Before the students read each passage, the teacher read the following script:

*Read this story carefully and aloud. I will tell you any words you do not know. When you are done reading this story, I will ask you ten comprehension questions which you will have in front of you. Each question will have three responses and you will use your comprehension strategies to find the best answer.*

After reading the passage, the students turned over the paper to the questions on the back. The question and answer choices were read aloud while the students marked their answer. This took between seven to 15 minutes.

*Treatment.* After baseline data was established, each student received instruction for using RAP. Treatment took eight, nine, and seven sessions for Molly, Edward, and Shane respectively. Treatment was terminated for a participant once he or she could use RAP without any teacher prompts and completed all four probes. After steps one through five of the SIM were complete, the first probe was given which was an unknown passage with ten multiple-choice questions from *Timed Readings Plus Book One* (Spargo, 1998).

After the first probe was given, steps six and seven of SIM were rehearsed. After steps six and seven were rehearsed, RAP practice took place until the student could independently use RAP without any teacher prompts. Once a student could use RAP without any teacher prompts, the student was given three unknown reading passages with ten multiple-choice questions from *Timed Readings Plus Book One* (Spargo, 1998). The remaining three probes were given on three separate days. The probes were given under the same conditions as the baseline probes with the same directions. RAP data were gathered in the resource room 12 times. Data collection dates included September 23<sup>rd</sup>, 25<sup>th</sup>, 28<sup>th</sup>, 30<sup>th</sup>, and October 6<sup>th</sup>, 9<sup>th</sup>, 13<sup>th</sup>, 14<sup>th</sup>, 19<sup>th</sup>, 21<sup>st</sup>, 22<sup>nd</sup>, and 23<sup>rd</sup>. Data collection on

these days took between seven to 15 minutes depending on each student's reading rate of the passage and time used to answer the ten-multiple choice questions.

*Maintenance.* Maintenance probes were administered once every two weeks for two months after treatment. The maintenance probes were administered in the same way that baseline probes and treatment probes were administered.

## CHAPTER 4

### Results

The purpose of this study was to determine if RAP improved the comprehension scores of elementary students with learning disabilities and if the results of RAP were maintained two months after treatment. Each probe of 10 comprehension questions contained five literal comprehension questions and five inferential questions. The literal questions pertained to facts directly stated in the reading passage and the inferential questions required inferential skills.

#### *Molly*

During baseline, Molly's mean score for the literal questions was 64% and increased to 65% after intervention. Her mean score for inferential was 52% during baseline and her mean score improved to 70% after intervention. After two months of maintenance checks, her mean score for literal questions increased to 83%, and her mean score for inferential questions decreased to 63%, but was still an improvement compared to her baseline data. As seen in Figures 1 and 2, Molly's baseline was stable prior to treatment. During treatment, Molly displayed a stable trend in Figure 1 for literal questions and an ascending trend in Figure 2 for inferential questions.

#### *Edward*

During baseline, Edward's mean score for the literal questions was 63% and increased to 85% after intervention. His mean score for inferential questions during baseline was 40% and his mean score increased to 70% after intervention. After two months of maintenance checks, his mean score for literal questions increased to 88% and his mean score for inferential questions increased to 72%. As seen in Figures 1 and 2,

Edward's baseline was stable prior to treatment. During treatment, Edward displayed a stable trend in Figure 1 for literal questions and an ascending trend in Figure 2 for inferential questions.

### *Shane*

During baseline, Shane's mean score for the literal questions was 83% and increased to 90% after intervention. His mean score for inferential questions during baseline was 50% and his mean score improved to 75% after intervention. After two months of maintenance checks, his mean score for literal questions decreased to 80% and his mean score for inferential questions remained at 75%. As seen in Figures 1 and 2, Shane's baseline was variable throughout. During treatment, Shane displayed a stable trend in Figure 1 for literal questions and an unstable trend in Figure 2 for inferential questions. However, the range of his scores for inferential questions was higher than his range during baseline as seen in Table 1.

Table 1  
*Percentage of Mean Scores, Range, and Percentage of Overlap*

<u>Participant</u>	<u>Baseline</u>		<u>RAP Intervention</u>			<u>Maintenance</u>		
	<u>Mean</u>	<u>Range</u>	<u>Mean</u>	<u>Range</u>	<u>Percentage of Overlap</u>	<u>Mean</u>	<u>Range</u>	<u>Percentage of Overlap</u>
<i>Molly</i>								
BR	64%	60-80%	65%	40-80%	75%	83%	80-100%	85.7%
UI	52%	40-80%	70%	20-100%	25%	63%	60-80%	100%
<i>Edward</i>								
BR	63%	20-80%	85%	80-100%	100%	88%	80-100%	100%
UI	40%	20-80%	70%	60-80%	100%	72%	60-100%	80%
<i>Shane</i>								
BR	83%	60-100%	90%	80-100%	100%	80%	80%	100%
UI	50%	0-60%	75%	60-100%	100%	75%	60-100%	100%

*Note.* BR=Literal; UI=Inferential.

The percentage of overlapping data points examined how data from one phase changed from the data collected in the following phase. The lower the percentage of overlap, the more impact the intervention has had on the dependent measures. The percentage of overlapping data points was calculated using the following procedures: (a) the range of data point values of the first phase was calculated, (b) number of data points in the following phase was counted, (c) the number of data points in the second phase that were within the range of the first phase were counted, and (d) the number of data points that fall within the range of the first phase was divided by the total number of data points of the second phase and multiply by 100. As seen in Table 1, the greatest impact occurred with all participants for the inferential questions.

The range of the percentage scores from baseline to intervention is also presented in Table 1. Shane's range during baseline varied from percentage scores of 60% to 100% on literal questions and 0% to 60% on inferential questions. After intervention, Shane's range of scores decreased slightly for literal questions and substantially for inferential questions demonstrating more consistent and more accurate performance as his range on literal questions improved to 80% to 100% while his inferential range improved to 60% to 100%. During maintenance, Shane also demonstrated more consistent performance. During intervention, the range of Edwards's scores decreased while his overall percentage scores increased. His performance remained consistent and even improved during maintenance. . Although there was little difference in the range of Molly's scores, the highest range of her scores for inferential questions increased and she showed the lowest amount of percentage overlap across phases (See Table 1).

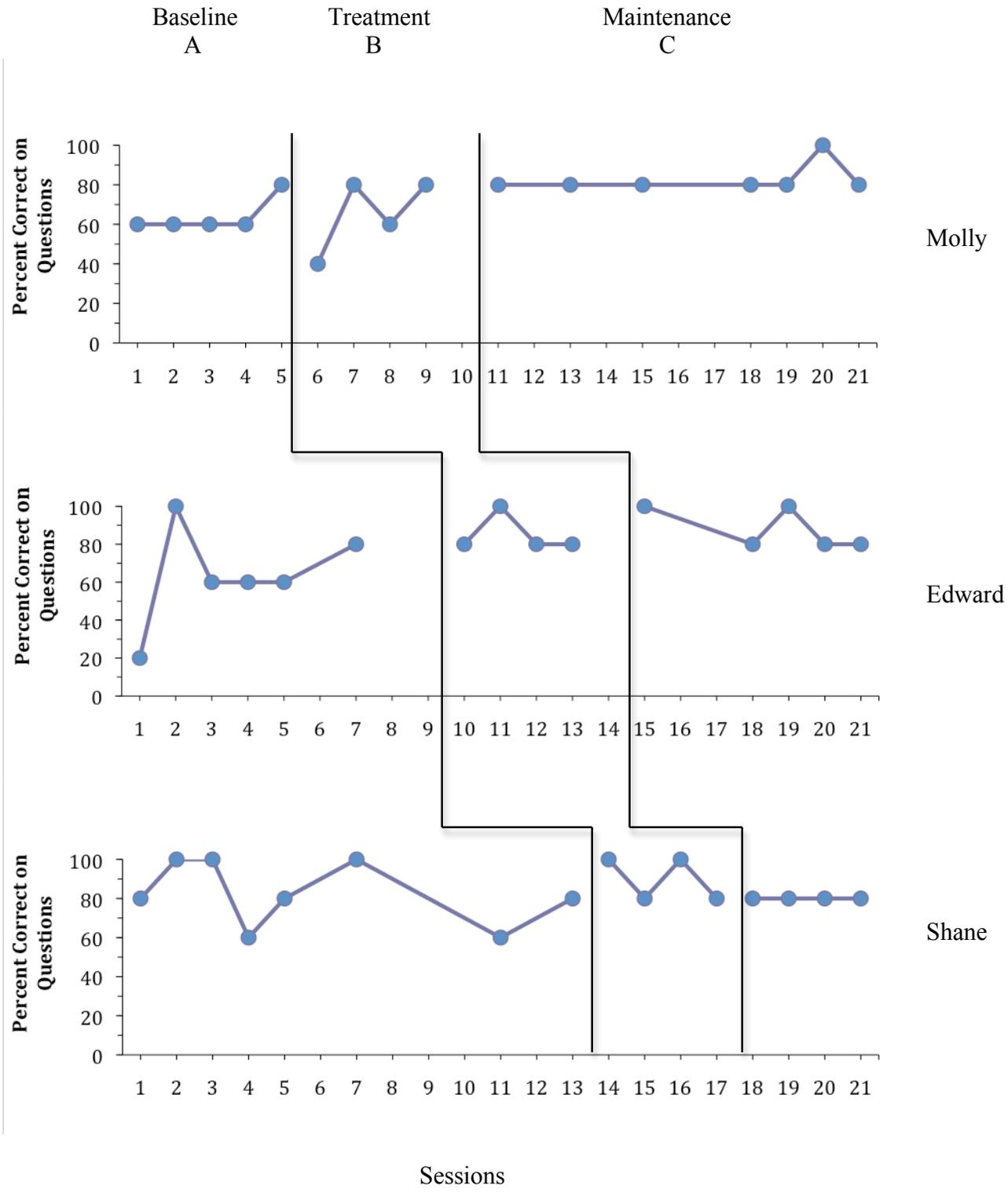


Figure 1. Percentage scores for literal questions.

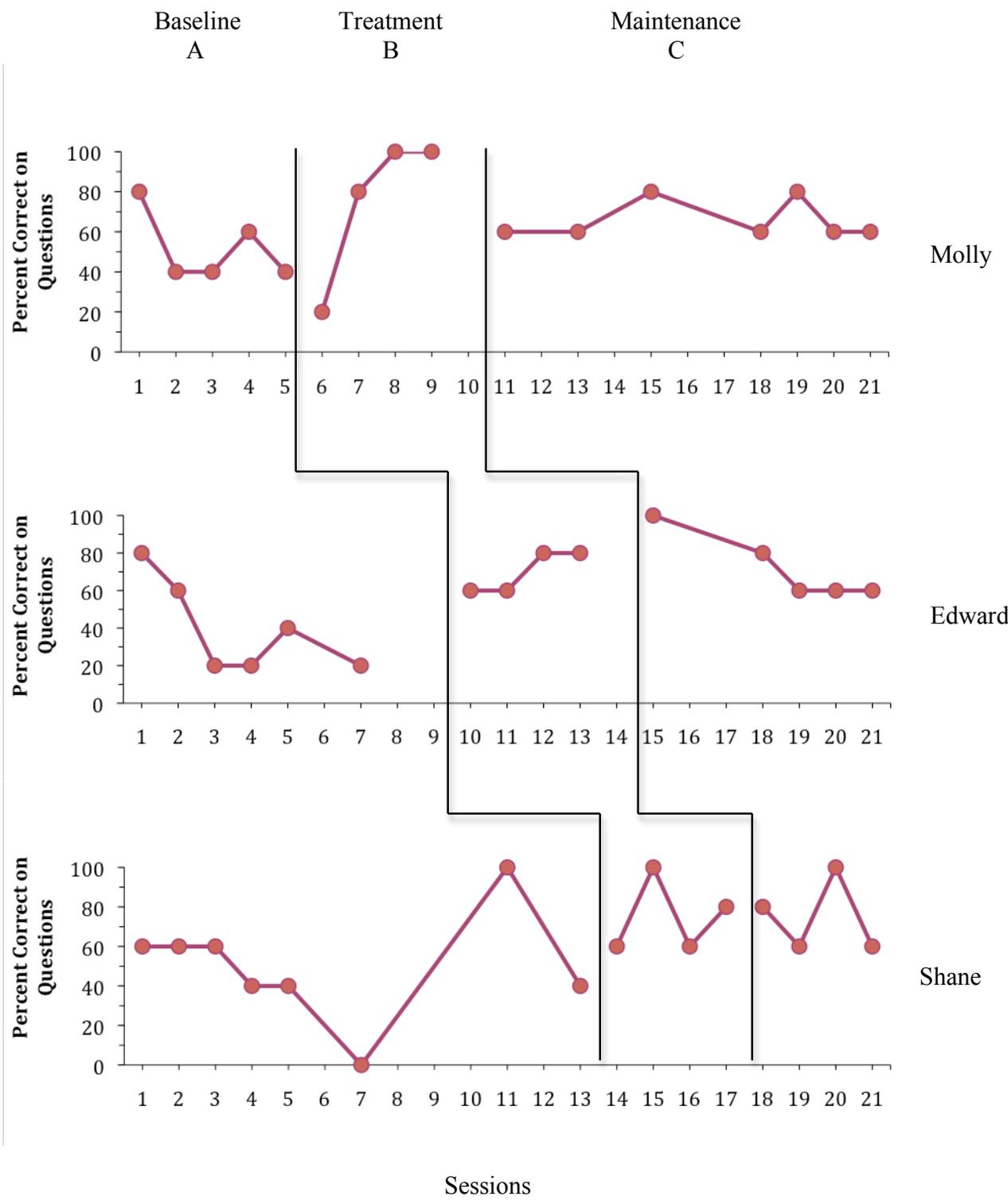


Figure 2. Percentage scores for inferential questions.

## CHAPTER 5

### Discussion

The purpose of this study was to determine if RAP improved the comprehension scores of intermediate students with LD and whether results were maintained two months after it was discontinued. Literal questions pertained to facts directly stated in reading passages. The inferential questions required inferential skills. Three results were obtained from the present study. First, RAP had little effect on literal comprehension. Second, RAP did substantially improve participants' inferential reading comprehension. Third, increases in reading comprehension were maintained and even improved two months after RAP was discontinued.

#### *Cognitive Strategies and Literal Comprehension*

The RAP intervention did not result in a substantial improvement for literal comprehension questions, although some small gains were obtained. From baseline to maintenance, the range of the participants' mean percentage scores on literal comprehension increased. All three students had higher mean percentage scores during baseline for literal comprehension questions than those for inferential comprehension questions. Therefore, literal comprehension appeared to be a stronger skill for participants than inferential comprehension. Literal comprehension is based on information that is directly stated in a reading passage. Although literal comprehension requires problem-solving skills, it does not require as many higher-level thinking skills as inferential comprehension. In order to answer inferential questions, readers must fill in missing information with prior knowledge and make deductions about the questions (Davey & Macready, 1990). Literal comprehension questions do not require this skill. It

makes sense why cognitive strategy instruction, such as RAP, would produce more substantial effects for inferential comprehension instead of literal comprehension. Inferential comprehension requires more cognitively complex skills compared to literal comprehension (Davey & Macready, 1990). Therefore, the need for a cognitive strategy, like RAP, is activated and can be used to aid inferential comprehension. Past RAP research (Ellis & Graves, 1990; Hagaman & Reid, 2008; Katims & Harris, 1997; Lauterbach & Bender, 1995; Lee & Von Colln, 2003) demonstrated improvements in answering multiple-choice or open-ended comprehension questions similar to the present study. However, only one previous RAP study (Hagaman & Reid, 2008) addressed positive treatment effects for both literal and inferential questions. The present study's results regarding literal comprehension corroborate the results found by Hagaman and Reid (2008). The present study extends the literature by using RAP with elementary students because the previous RAP studies used middle school and high school students.

#### *Inferential Comprehension Improvement*

RAP instruction did result in substantial improvements in inferential reading comprehension. Baseline data for inferential questions corroborates past research indicating inferential questions have been more difficult for students with LD than answering literal questions (Holmes, 1985).

Past RAP research (Ellis & Graves, 1990; Hagaman & Reid, 2008; Katims & Harris, 1997; Lauterbach & Bender, 1995; Lee & Von Colln, 2003) resulted in positive gains when answering multiple-choice or open-ended comprehension questions. The present study also produced positive results for inferential comprehension. Conversely, Hagaman and Reid's (2008) baseline scores were similar for literal and inferential

comprehension questions demonstrating that their participants struggled in both literal and inferential comprehension. In the present study, inferential comprehension was a weaker skill and thus made the most gains with RAP. The present study extends RAP literature because only one previous RAP study conducted by Hagaman and Reid (2008) broke down comprehension into two types, literal and inferential comprehension questions. The present study and Hagaman and Reid both found substantial improvements for inferential comprehension.

Brown, Pressley, Van Meter and Schuder (1996) found that cognitive strategy instruction in the area of reading comprehension helped struggling readers in second grade perform better on standardized reading tests and story retelling when compared to second grade students who did not receive strategy instruction. Standardized reading tests can contain both literal and inferential comprehension questions. Based on the results of this research with second graders and the results of the present study with fourth graders, cognitive strategy instruction, including RAP, may also improve reading comprehension of third grade students who are experiencing difficulties in this area.

In addition to students with LD, students with language impairments can struggle with reading comprehension due to deficiencies in integrating information and making inferences, understanding text structure, and monitoring comprehension (Kelso, Fletcher, & Lee, 2007). As the results in the present study demonstrated, both Molly and Edward experienced substantial improvements in answering inferential questions after receiving RAP. Using RAP aided monitoring comprehension because part of the strategy includes stopping after reading a paragraph and stating the main ideas and two details in their own words. In past research, students with language impairments in fourth and sixth grades

demonstrated improved reading comprehension from post-tests after receiving cognitive strategy instruction (Takala, 2006). Making inferences requires more complex cognitive skills, so a cognitive strategy like RAP may activate these higher-level skills so students with LD and/or language impairments can be more successful when answering inferential questions.

Struggles with reading comprehension have been heavily documented in students with reading disabilities and ADHD (Ghelani, Sidhu, Jain, & Tannock, 2004). Reading comprehension performance of students with ADHD has often decreased as reading passage length increased (Cherkes-Julkowski, Stolzenberg, Hatzes, & Madaus, 1995). Brock and Knapp (1996) found that students with ADHD had difficulties stating main ideas from reading passages. RAP provided a structure with the steps of the strategy that addressed both issues which is decreasing comprehension as the passage length increases and stating main ideas from reading passages. When using RAP, a student needs to stop after each paragraph to state the main ideas and two details in their own words. This step breaks up a long reading passage into more manageable sections to support comprehension. Also, RAP devotes a large amount of time to identifying main ideas and details. Due to the nature of the strategy and the teaching time that can be used with identifying main ideas, students with ADHD may be able to practice stating main ideas from reading passages which would increase their reading comprehension.

One of the participants in the present study, Shane, was diagnosed with ADHD. After RAP was implemented, his percentage scores for literal questions increased and remained stable during maintenance. Shane also increased his range of percentage scores for inferential questions after treatment.

The primary years of elementary school focuses reading instruction on phonics and comprehension. Intermediate grades start using reading as a way to learn new information (Chall, 1979). Comprehension strategies like RAP may support this transition when the focus of reading shifts to learning as was the case for participants in the present study.

### *Maintenance*

The RAP intervention resulted in maintenance of treatment effects for all three participants. Two participants experienced continued improvement during maintenance for literal comprehension. Consequently, using RAP with students with LD was time effective because improved reading scores were maintained. The reasoning for why literal comprehension continued to improve during maintenance is unknown at this time. Gersten, Fuchs, Williams, and Baker (2001) found that reading comprehension cognitive strategies produced positive results for students with LD, but maintenance effects were uncertain in these studies. One possible reason why literal comprehension continued to improve during maintenance in the present study is because participants did report use of RAP in their general education classrooms and this may have lead to additional practice of RAP. Past research using RAP only conducted maintenance probes for up to two weeks post-intervention (Ellis & Graves, 1990; Hagaman & Reid, 2008; Lauterbach & Bender, 1995). Along with the present study, these three RAP studies continued to produce positive effects for reading comprehension. The present study adds to the literature base on RAP as maintenance probes were conducted for two months post intervention and demonstrated positive effects for reading comprehension still occurred from RAP instruction.

### Implications for Practice

The results of this study suggest that RAP instruction can be effective for improving the reading comprehension of students with learning disabilities. In a brief amount of time, fourth grade students with LD were able to learn how to use RAP effectively and experienced improvements in their ability to answer literal and inferential comprehension questions. Katims and Harris (1997) found positive results using RAP to increase reading comprehension for students with and without learning disabilities. RAP is an intervention that could be taught in a large group setting, small groups, and/or a one-on-one setting. Due to the variety of ways RAP can be taught, it can be used in the general education classroom for all students and/or co taught with a special education teacher and general education teacher.

The process used to teach RAP was simple and contained easy to follow steps. Due to this simple process, special education and general education teachers could train para-educators how to teach RAP to students. Reading instruction led by para-educators has led to positive results in reading performance for elementary students ranging in age from second grade up to fifth grade (Vadasy, Sanders, & Tudor, 2007; Vadasy & Sanders, 2008).

Although RAP was used with students already identified with LD, it may also be used in a Response to Intervention (RtI) paradigm. According to the RtI model, research-based interventions must be administered to struggling students before being considered for special education services (Fuchs, Fuchs, & Speece, 2002). In this study, RAP was taught and practiced in sessions that lasted no longer than 30 minutes. Many schools try to conduct RtI groups that last about thirty minutes so not to interrupt any whole-group

instruction in reading, writing, or math. Due to the research support for cognitive strategies and the ease of implementation, RAP could be a useful intervention for RtI.

#### Limitations and Future Research

There are some limitations in the present study. First, due to yearlong construction at the school building, students and staff were relocated to a temporary site for the school year. This temporary site was separated into two different sections with each section consisting of at least 15 classrooms including grade level classrooms, Reading Recovery rooms, and small group spaces. Classrooms did not have doors. Rather, they were separated by walls approximately eight feet high while the actual ceiling was approximately 25 feet high. This environment creates distractions. For example, classroom instruction, student voices, and hallway traffic can be heard in every room. Shield & Dockrell (2003) found that that poor acoustics in the classroom lead to a negative learning environment. The increased noise and visual distractions in this environment could have negatively affected all three students' performance.

A second limitation was the lack of empirical research for the assessment material, *Timed Readings Plus Book One*. A search on Academic Search Premier and PsycArticles did not provide any information about *Timed Readings Plus Book One*. However, *Timed Readings* was used in a RAP study conducted by Katims and Harris (1997).

A third limitation involved the implementation of RAP. Throughout the study, RAP was taught and assessed by the same person. Teacher implementation has been less successful in early childhood settings than researcher implementation (Byrne & Fielding-

Barnsley, 1995). Although this study was conducted in an elementary school and not in an early childhood setting, the same issue may have existed.

A fourth limitation was that generalization was not assessed. The focus of the present study was to determine if RAP was an effective strategy to improve reading comprehension scores for students with LD and if treatment effects could be maintained two months after intervention. Although participants were asked after treatment if they used RAP in other classes and subjects, no formal data were collected.

A final limitation was that the multiple-choice test items and possible answers were read aloud to participants. This was done for two reasons: (a) the purpose of the study was to measure comprehension, not focus on decoding; (b) Hagaman and Reid (2008) also read aloud test items in their RAP study.

Future research should investigate the effects of RAP in an environment that is more conducive to learning compared to the environment of the present study. In order to determine if the lack of empirical research for *Timed Readings Plus Book One* had an effect on the present study, future research with RAP should be conducted using empirically researched assessment materials. Additional research should determine whether there is an effect on the results of RAP on reading comprehension when RAP is taught and assessed by different people with varying degrees of experience.

Future RAP studies should have the participants read comprehension test items and possible answers. This may determine if there are any differences in comprehension scores when the participants read the test items and answers as compared to when the comprehension test items and answers are read aloud. In addition, future research should focus on assessing generalization of RAP. In order for students with LD to be successful

in general education classrooms, it is imperative that they use learned strategies across a variety of settings and contents. Finally, future research should replicate RAP studies, such as the present study, with larger numbers of participants with LD and/or varying disabilities to establish external validity.

### Summary

The present study was conducted for two purposes: (a) to determine the effects of RAP on the reading comprehension scores of elementary students with LD and (b) to determine the maintenance effects of RAP at one and two month intervals after treatment was discontinued. Past RAP research had only been conducted with middle school and high school students and had not yet included elementary students. Also, maintenance probes were only conducted for up to two weeks after treatment in past research, so long term benefits of RAP were unknown. Results of the present study showed positive effects on literal comprehension and substantial improvement for inferential comprehension. In addition to these gains, maintenance effects were positive demonstrating that RAP is a strategy that can continue to produce positive results for students with LD two months after treatment.

The present study contributes to the field of reading remediation because it demonstrated that RAP was effective for use with elementary students with LD. It was time efficient and produced positive results after treatment and up to two months afterwards for literal comprehension and inferential comprehension. Because inferential comprehension requires more cognitively complex skills compared to literal comprehension, the results of the present study indicated RAP can be a useful strategy for

inferential reading comprehension which can be a difficult academic area for students with LD.

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