Increasing Inferential Reading Comprehension Skills: A Single Case Treatment Study

Augmenter les habiletés de compréhension en lecture à l'aide d'inférences : une étude de traitement

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KEY WORDS

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Abstract

This pilot study investigated the effects of an inferential reading comprehension intervention program implemented in a public school setting with a fourth grader with a language disorder. The 8-week treatment period involved teaching a systematic approach for differentiating literal and inferential question types and specific strategies for answering the latter. Improvement was noted in the ability to answer inferential comprehension questions after reading a passage and in standardized reading comprehension test performance. No change was noted on a receptive vocabulary control measure. These results lend preliminary support to the effectiveness of this intervention approach.

Abrégé

Cette étude pilote explorait les effets d'un programme d'intervention sur la compréhension en lecture à l'aide d'inférences mis en œuvre dans une école publique avec un élève de quatrième année atteint d'un trouble du langage. La période de traitement de huit semaines comprenait l'enseignement d'une approche systématique de différenciation entre les questions littérales et celles nécessitant des inférences ainsi que des stratégies particulières de réponses à ce type de questions. On a noté une amélioration dans la capacité de répondre aux questions de compréhension après la lecture d'un passage requérant des inférences et dans les performances à un test standardisé de compréhension en lecture. Aucun changement n'a été noté sur une mesure de contrôle du vocabulaire réceptif. Ces résultats offre un appui préliminaire à l'efficacité de cette approche d'intervention.

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When children move into the upper primary grades, there is a shift in instructional emphasis from learning to read, or decoding, to reading to learn, or comprehension. There are very few areas of the school curriculum that don't require the ability to read and understand (McGee & Johnson, 2003). Reading requires active participation in the search for meaning. Text comprehension is critical to academic success and must be approached in a purposeful way.

Comprehending a passage is a complicated process in that the text's meaning is a combination of the explicit, literal meanings of the words and sentences, as well as the inferred meanings that can be uniquely generated by the reader. Given that meaning is not given solely in the text, but is mentally constructed by readers during the reading process (Maria, 1990), the total message within the written discourse is dependent upon the reader applying additional knowledge and "reading between the lines." An author does not explicitly state all of the information necessary for comprehension, as this would be both laborious and redundant (Gillam, 2007). The key to the generation of the implicit meanings involves the reader's ability to make inferences. The ability to generate inferences is an essential skill that greatly determines the degree to which a passage will be understood (Cain, Oakhill, & Elbro, 2003; Casteel, 1993; Omanson, Warren, & Trabasso, 1978; Zabrusky, 1986). Without explicit training, it is more difficult for children to answer inferential questions about a text than literal ones (Hansen & Pearson, 1983)

Given the impact of inferential ability on successful comprehension, students with language/ learning disabilities, who often struggle to understand what they hear and read, may exhibit specific difficulties with this skill. Research supports this conclusion (Adams, Clarke & Haynes, 2009; Dodwell & Bavin, 2008; Laing & Kamhi, 2002; Scannell-Miller, 1982). While some studies have focused on children with specific language difficulties and others on children with learning disabilities (e.g., reading decoding and/or comprehension difficulties), several common characteristics have emerged with regard to their listening and reading comprehension skills. Regardless of whether a deficit is inherent in basic language skills, reading, or both, there is evidence that these students engage in inferential processing less often and less effectively than their normally-achieving peers during both listening and reading comprehension tasks. Specifically, in the context of generating inferences in listening comprehension tasks, participants with language/learning disabilities tend to perform like younger children (Adams, Clark & Haynes, 2009; Scannell-Miller, 1982), to make more errors on inferential questions than their typically developing peers (Dodwell & Bavin, 2008), and to generate fewer inferences than their age mates (Laing & Kamhi, 2002; Snyder, 1984). In the context of reading comprehension activities, students with language/learning disabilities have been found to demonstrate the ability to infer but need more direction about the nature and appropriateness of inferential strategies (Wong, 1988). Additionally, they produce similar proportions of inferences during free recalls of a target passage but of a different quality (Tierney, Bridge & Cera, 1978), answer fewer inferential questions correctly (Oakhill, 1984) and provide more illogical, intuitive answers to inferential comprehension than their typically developing peers (Wilson, 1979). Thus, students with language/learning disabilities struggle with inferential processing and, as a result, struggle with comprehension.

These students' difficulties with inferential tasks may occur for a variety of reasons. One possibility is that they are not given enough practice with this type of reasoning. Activities within basal readers tend to include and classroom teachers tend to ask more literal than inferential questions (Guszak, 1967; Hansen, 1981). In addition, studies of classroom interaction suggest that the lower-achieving students or poorer readers are asked fewer inferential questions than are the better readers (Sadker & Sadker, 1982). Another source of difficulty may be that poor readers do not consistently or effectively use their prior knowledge to answer inferential questions (Gillam, 2007) and, even with accurate prerequisite information, answer them less effectively (Holmes, 1984). There is also evidence that poor readers produce fewer elaborations from prior knowledge during reading (Reder, 1980; Tierney et al., 1978). Inferential difficulty could also result from an overemphasis on background knowledge and subsequent formation of "intuitive" or tangential answers when prior knowledge overshadows text information (Williams, 1993). Erroneous conclusions may not be discarded and negatively influence future comprehension. Lastly, children with language/ learning disabilities might be "inactive learners" who do not activate selective attention and/or do not choose and employ appropriate cognitive strategies (Carr & Thompson, 1996). This lack of self-regulated learning is common in a large percentage of students with language/learning disabilities (Bashir & Singer, 2006; Graham & Harris, 2012; Wong, 1994) such that many have limited awareness of domain-specific knowledge, skills and strategies, how to apply them, and when to deploy them for effective and efficient task performance (Garner, 1990; Troia, 2002).

Given the importance of inferential thinking to successful reading comprehension and academic success, there is a need for an intervention program that efficiently addresses all of these potential difficulties. Several intervention programs have been created to improve inferential comprehension skills for students with language/learning disabilities. McGee and Johnson (2003) taught less skilled

"comprehenders" between the ages of 6 and 9 how to make inferences through question generation and prediction, which resulted in improved reading comprehension performance after 6 training sessions. Hansen and Pearson (1993) made good and poor fourth grade readers aware of the importance of drawing inferences, activated background knowledge prior to reading, encouraged predictions based on this knowledge, and provided opportunities for practice answering inferential questions. Results showed that poor readers benefited significantly from the instruction. Holmes (1984) taught disabled readers a structured inferential comprehension strategy involving the use of key words in the text and self-questioning in the context of reading materials arranged from easy to more difficult. The group that had both strategies and graded materials scored significantly better than the other experimental groups on inference question tasks. Carr, Dewitz, & Patberg (1989) developed the Inferential Training Technique (ITT) for expository text, which includes a modified cloze procedure to introduce and model the strategy and a self-monitoring checklist to transfer the strategy to new situations. The exercises focus attention on text clues and relate text information to prior knowledge to fill in the cloze blanks. They found that ITT was successful in improving comprehension and comprehension monitoring (Carr, Dewitz & Patberg, 1989). Brown, Palinscar, and Armbruster (1984) assessed the effects of explicit training in comprehension for children who had poor comprehension by using a gradual transfer of responsibility for asking inferential questions from the teacher to the child. Children were first taught directly and then gradually regulated their own activity in summarizing, questioning, and predicting text content and they improved performance on comprehension exercises which also generalized to other text-based tasks. In sum, teacher modeling, active student engagement, and strategy use appear to be important elements in comprehension intervention.

Based on the inferential difficulties faced by students with language/learning disabilities and treatment studies that have been conducted, improved inferential comprehension requires the following: (1) awareness of, exposure to, and practice with inferential reading comprehension questions; (2) activation of prior knowledge prior to and appropriate application of while answering inferential questions; (3) appropriate interpretation of background information provided in the text; and (4) self-regulated learning via active use of inferential comprehension strategies. Self-regulated learners establish and maintain motivation, use supports when help is needed, mediate performance with language, and understand how and when to use specific strategies (Schunk & Ertmer, 2000).

While the treatment studies described earlier each include several of these four elements, Milosky and Ford (1996) developed a multi-faceted inferential comprehension intervention that includes all four. Students first learn to identify and distinguish between literal (e.g., the answer can be found in the passage) and inferential questions, specifically recognizing the nature of an inferential question (e.g., the answer is not in the passage). They are then taught to activate their background knowledge and to make appropriate predictions during reading, shown how individual words add meaning to a sentence and can be used to activate their knowledge efficiently, and taught an inference-specific strategy that involves a "puzzle metaphor" to guide self-regulated thinking/learning. Specifically, they identify an inferential ("puzzle") question and then "put the pieces together" through self-talk (e.g., *Is there a sentence in the book that gives the answer? If "No" then this is a puzzle question. What information in the book will help me? What else do I know about _____ that will help me? How does this information fit together to create an answer that makes sense?*). These skills are modeled by the teacher, written out on a help sheet, and practiced initially in controlled and scaffolded activities. Students then progress to applying their knowledge and to using this process in the context of functional academic material. To date, no data are currently available as to the success of this program, nor have any inferential comprehension intervention studies been conducted in a typical, public school therapy setting.

The last issue that needs to be considered is the concept of evidence-based practice (EBP), or "the conscientious, explicit and judicious use of current best practice in making decisions about the care of individual patients… by integrating individual clinical expertise with the best available external clinical evidence from systematic research" (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996, p. 71). The potential benefits of EBP include bridging the divide between research and practice, improving clinical services, making clinicians more accountable, and reducing variation in service provision (Zipoli & Kennedy, 2005). The American Speech-Language-Hearing Association (ASHA) has issued an official policy stating that speech-language pathologists integrate the principles of evidence-based practice into the clinical decision-making process (ASHA, 2005). Yet, in the area of language disorders in children, there is not a large body of clinical research evidence available (Cirrin & Gillam, 2008). In their review of the last two decades of language intervention studies in search of those that met Level 1 (randomized clinical trials) and Level 2 (non-randomized comparison studies or multiple baseline single participant designs) evidence requirements, they only found 21 studies that met these criteria. And, many of those studies that did qualify were conducted with preschool (i.e., 3-4-year-old) children.

Therefore, the goals of the current study were to document improved inferential comprehension skills after implementing a multi-faceted treatment program in a public school setting and to add to the evidence base in child language intervention using a Level 3b (Phillips et al., 2001; http://www.cemb.net/levels_of_evidence.asp) quasi-experimental single participant treatment design. Specifically, the purpose of the present investigation was to examine improvement in the inferential reading comprehension skills of a fourth grader with a language disorder following implementation of the Milosky and Ford (1996) treatment paradigm.

Method

Design

Treatment was administered in the context of an ABABABA design with an initial triple baseline (i.e., the first A, or no treatment, phase) to ensure stability of the target behavior. Interspersed within the B (i.e., intervention) phases, treatment was withdrawn for a week creating the latter A (i.e., no treatment) phases to examine performance in the absence of intervention. Standardized pre- and post-test measures were also utilized to further examine behavior change. The pretest, treatment and posttest schedule is documented in Appendix A.

Participant

One fourth grade Caucasian male (age 10;6), Z, was selected for treatment based on the following characteristics: He demonstrated a language disorder and qualified as a student with a speech/language impairment based on Washington State criteria (i.e., "2(l) Speech or language impairment means a communication disorder, such as stuttering, impaired articulation, a language impairment, or a voice impairment, that adversely affects a student's educational performance."), was served by his public school's speech/language pathologist, received no other special education services (e.g., content mastery), received language therapy for expressive and receptive language delays, spoke English as a first language, and had current treatment goals addressing improved comprehension, categorization, and oral narrative production. In addition, the student's teacher reported that he was struggling with reading comprehension because he was "concrete and didn't draw conclusions." Prior to the study, a standardized measure of reading comprehension and of receptive vocabulary were administered to gain additional information about vocabulary and reading abilities relevant to the investigation. These instruments then served as pre- and post-test measures. The second author received informed parental consent to share study-related assessment and treatment data.

Pre- and Post-Test Assessment Measures

Standardized Reading Comprehension Test

Reading comprehension was assessed through standardized administration of the Gates-MacGinitie Reading Test (GMRT) 3rd Edition Passage Comprehension subtest (MacGinitie & MacGinitie, 1989). Z scored in the below average range on this subtest, indicating specific difficulty answering reading comprehension questions.

Control Measure

The Peabody Picture Vocabulary Test – 3 (PPVT-3) (Dunn & Dunn, 1981) was administered as a pre- and post-treatment control measure. While not an identical task to answering comprehension questions, both are receptive language skills for which application of contextual knowledge can be a contributor and are reliable standardized tests on which student's performance would typically remain fairly consistent. Receptive vocabulary was not targeted during intervention; thus, we conceptualized this task as a quasi-control for developmental changes to increase our confidence that any change in inferential question-answering ability could be attributed to the treatment targeting it. We note that there are flaws in this argument due to differences in the types of knowledge required for inferential comprehension versus comprehension of vocabulary. Additionally, the use of standardized pre- and post-test measures creates the risk of a practice effect that offsets a change in behavior that is not attributable to the treatment. If this were the case, improved performance on both standardized measures would be expected.

Standardized pre-test scores are detailed in Table 1.

Informal Inferential Measure

To further examine inferential abilities in reading comprehension, an informal inventory of Z's errors on the Gates-MacGinitie Reading Comprehension subtest (MacGinitie & MacGinitie, 1989) was completed. This subtest is comprised of literal and inferential question types, both of which are defined in the test manual. At pretest, Z answered 34% (9/26) of the inferential questions correctly and 52% (10/19) of the literal questions correctly.

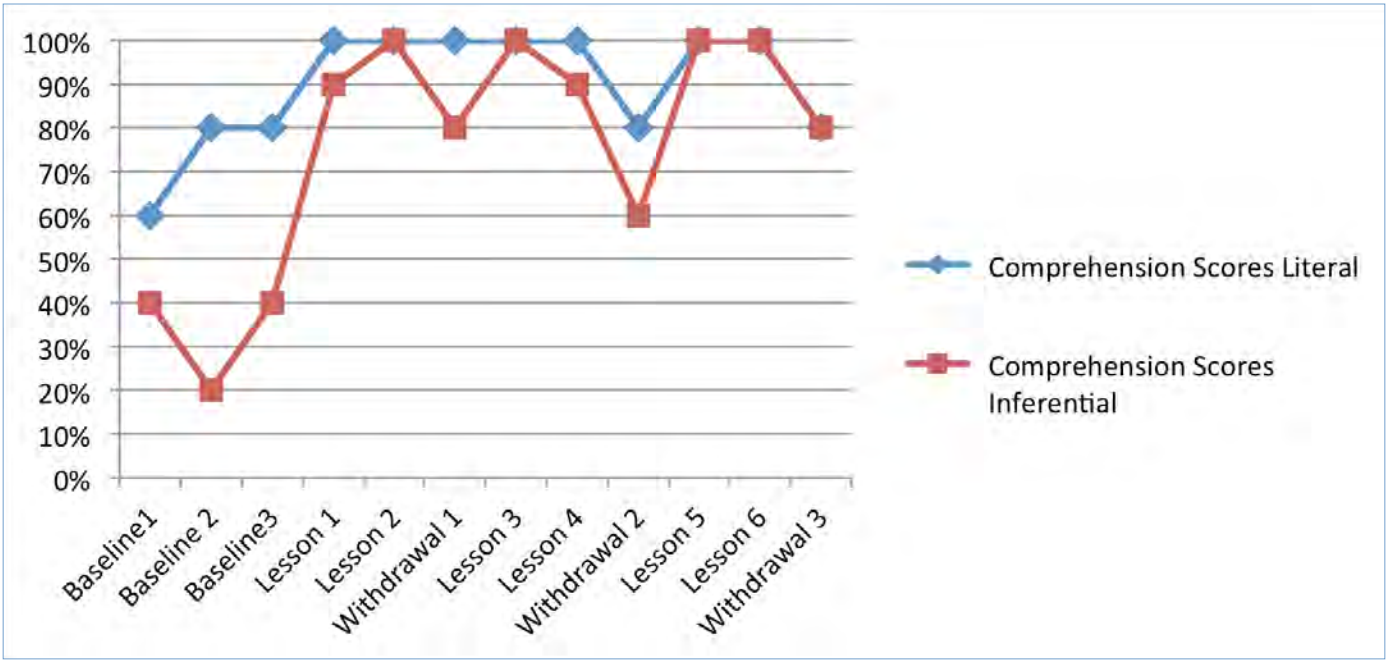
Baseline, Treatment and Withdrawal Reading Comprehension Tasks

The baseline, treatment and withdrawal comprehension tasks utilized reading materials taken from the Steck-Vaughn Level 3 Reading Comprehension workbook (Steck-Vaughn Company, 1999). The passages were narrative in nature, were written at a third grade reading level, and had a mean length of 250 words. Given Z's below average score on the GMRT subtest, the third grade readability

Table 1: Pre- and Post-Treatment Standardized Test Scores (percentile ranks)

Test	Percentile Rank scores (Pre)	Percentile Rank Scores (Post)
PPVT-III (Control Measure)	39	32
Gates-MacGinitie Reading Comprehension Subtest	3	30

Figure 1: Baseline, Treatment and Withdrawal Data: Percentage of Literal and Inferential Comprehension Questions Answered Correctly



level was selected to ensure Z's ability to focus on his use of the new comprehension strategies rather than struggle with vocabulary or decoding. Z was able to read the passages without assistance. Each passage was followed by ten reading comprehension questions written by both authors, five of which were literal (e.g., "Where did Joe go?") and five of which were inferential (e.g., "Why did Joe feel sad?"). Specifically, questions were classified as literal "if the student could answer by choosing a restatement of something stated explicitly in the passage." Questions were inferential if "the student could not answer the question by choosing a restatement of something stated explicitly in the passage (MacGinitie & MacGinitie, 1989). Once the 10 questions were formulated for each passage, they were rated as literal or inferential by an independent rater (a licensed speech/language pathologist) who was provided with the definitions described above. Only questions with 100% agreement between the authors and the independent rater were included in the study. See Appendix B for an example stories and questions.

Treatment

The participant received the inferential comprehension intervention during one weekly 40-minute session with another student in the speech room at his school during an 8 week period (6 weeks of intervention and 2 weeks with no treatment). See Appendix A for this schedule. The other student received the same intervention but did not participate in the study. Treatment was conducted by the second author, a certified speech/language pathologist. During the first treatment session, the 4-step inferential question-answering process was introduced and the students then utilized it while completing the first two reading passages and the ten comprehension questions that followed. Instruction, feedback, and scaffolding were provided throughout. Specifically, before reading the passage, the students were first asked to make predictions about the story based on the title, thus activating their background knowledge. After reading the passage silently, the clinician introduced the five literal and five inferential questions, which were in a random order. The clinician

explained the difference between literal and inferential ("puzzle") questions. They were taught that, if it was not a puzzle question (but a literal one), then they should be able to go back and find the answer directly written in the story. The clinician then explained that the answers to some questions were not found explicitly in the passage and were therefore "puzzle questions" (e.g., inferential questions). The students read the questions aloud and discussed whether each was a "puzzle question" or not. Once they demonstrated understanding of these two question types, the "puzzle question" strategy was introduced. When the students came to these inferential questions they were guided to do the following:

1. Find information in the book that will help (e.g., use key words in sentences as clues).
2. Think about information that they already know that will help (e.g., Ask yourself, "What do I already know about this?")
3. Then, talk to yourself about how the information fits together logically to help you figure out the answer (e.g., "How does what I know fit together with what I read?")
4. Then think to yourself, "Based on what I know and what I read, does my answer make sense?"

The clinician modeled the process by thinking aloud. She then prompted students to make predictions, consider the puzzle metaphor, and think about specific words in a sentence that might provide clues to the answer. Scaffolding (e.g., Cues such as, *What kind of question is this? What should you do to find the answer?*) was provided as necessary. When students accurately answered inferential questions, they were asked to state the "clues" that helped solve the "puzzle question." This allowed the clinician to ensure that they had used their strategies successfully.

Once the predicting, question identification, and "puzzle question" processes were initially taught, each treatment session followed the same schedule: brief review of literal and inferential question types, review of the strategies for answering literal and "puzzle" questions, and completion of two passage-reading and question-answering activities. Clinician modeling and scaffolding were provided as needed.

Data Collection and Analysis

Prior to, throughout, and following completion of treatment, data were collected on the total number of literal and inferential comprehension questions answered correctly on the passage-reading and question-answering activities. During treatment, these tasks were initially completed with clinician instruction, modeling, scaffolding (e.g., *Since this is a puzzle question, what is the next step?*) and feedback, which was faded as intervention progressed. During the treatment withdrawal weeks, Z completed the same type of passage-reading, question-answering task with no assistance from the clinician. Percentage correct scores were calculated separately for the literal questions and for the inferential questions. Data analysis consisted of visual inspection of baseline, treatment and withdrawal data, along with calculation of effect size and comparison of pre- and post-test measures.

Results

The purpose of this study was to determine if the inferential reading comprehension skills of a fourth grader with a language/learning disability could be improved using background knowledge activation, instruction in literal and inferential question types, and a "puzzle question" strategy (Milosky & Ford, 1996).

Baseline, Treatment and Withdrawal Data

Z completed the exact same type of reading and question-answering activity during the baseline, treatment and withdrawal phases of the study. Three of these reading and question-answering tasks were completed prior to treatment. Then, treatment data were taken on two of these tasks during each session as the clinician provided instruction and scaffolding in applying new knowledge and using the puzzle question strategy. After the 2nd, 4th and 6th weeks of treatment, the intervention was withdrawn and the same reading and question-answering task was completed with no assistance from the clinician. Z's literal and inferential comprehension scores are detailed in Figure 1. Per visual inspection of the data, it appears that there was a trend toward improvement once treatment began, with 100% non-overlapping data for inferential questions and 78% non-overlapping data for literal questions. A decrease in performance on both question types was noted during the withdrawal weeks (with the exception of performance on literal questions during the first withdrawal phase), also providing support for a treatment effect. In order to quantify the magnitude of the change in level of performance on inferential questions, a variation of Cohen's d was used to calculate an effect size (Kromrey & Foster-Johnson, 1996). While not ideal, this measure can be calculated with only one post-intervention measure (Beeson & Robey, 2006). The standardized mean difference formula

$$\frac{\text{X post-intervention} - \text{X pre-intervention}}{\text{SD pre-intervention}}$$

was applied using a post intervention mean of 80, a pre-intervention mean of 33, and a SD pre-intervention of 11.5, which yielded an effect size of 4.08. This effect size

is considered medium based on those reported for single-subject studies by Robey, Schultz, Crawford, & Sinner (1999).

Post Test Data

On the Gates-MacGinitie Passage Comprehension subtest, Z's percentile rank went from 3 to 30, the latter of which indicated performance within the average range. Post test scores are detailed in Table 1. Informal documentation of performance on inferential questions provides additional support for a treatment effect. At post-test, Z answered 61% (16/26) of the inferential questions correctly and 73% (14/19) of the literal questions correctly (an increase from his pretest 34% and 52% respectively).

Control Measure

The PPVT-III was administered pre and post treatment as a control measure. Given that receptive vocabulary was a comprehension skill not being taught, it was predicted that the participant's performance on this instrument would not change over the course of the treatment period. The post-treatment percentile rank was actually slightly lower than the pre-treatment score, indicating no change in receptive vocabulary performance.

Qualitative Observations

While data were not systematically collected on strategy use, the level of scaffolding provided, and the amount of cueing required during treatment, informal behavioral observations were made throughout. With respect to the processes for answering literal and inferential questions, Z initially relied on step-by-step instruction for answering both question types. After the first two sessions he was able to independently identify both the literal and inferential question types correctly. In addition, when he encountered a literal question, he consistently verbalized the definition (e.g., that he "could find the answer within the story"). After lesson 3, he was able to self-cue to return to the story and find clues to answer the inferential questions. Scaffolding was faded between lessons 2 and 4 and accurate responses to both question types were provided independently during lessons 5 and 6. With regard to stating the clues that supported his inferential answer choices, Z initially did not consistently relate relevant world knowledge (e.g., he made tangential, unrelated comments) and relied on clinician cueing to remain focused on the question. By lesson 5, however, he was more accurate at providing appropriate information support when answering an inferential comprehension question.

Discussion

This study provides preliminary evidence that use of an inferential comprehension intervention program can have a positive effect on student performance. Data from three of the analyses support this conclusion. First, improved performance (from the initial baseline) was seen on the total number of inferential questions answered correctly on the measures completed during both treatment and withdrawal (i.e., no treatment) phases and the effect size for the change in performance was considered medium. Interestingly, a slight decrease in the percentage correct scores was noted when the treatment was withdrawn. The decreases could support the treatment effect such that strategy use and subsequent comprehension performance were benefitting from the intervention and lagged slightly when it was removed. These decreases in comprehension scores could also be indicative of the length of time required for effective strategy learning and use. Given that the treatment involved activation of background knowledge, use of context clues, and implementation of the newly learned "puzzle question" strategy, a great deal of self-regulation was required. While the long term goal of strategy instruction is automatic application in appropriate contexts, this process takes time. When a procedure is newly learned, it requires more effort to carry out, it competes with old, familiar strategies and concepts, and it is not widely adaptable (Pressley, 1995). The dip in inferential comprehension performance on the withdrawal probes provides evidence that, although improvement from baseline was noted, additional clinician support and structured practice beyond six treatment sessions may be necessary for ultimate inferential comprehension success.

A second piece of evidence is found in the change that was seen in standardized test performance, with the percentile rank score on the GMRT Passage Comprehension subtest moving from the below average range to the average range. There was also a decrease in the number of both inferential and literal question errors made on this same instrument at post-test. Lastly, the pre/post-test receptive vocabulary control measure (PPVT-III score) did not show change from pre- to post-testing. A control measure such as this one provides some, although limited, reassurance that the changes seen in inferential comprehension performance on the GMRT were not a result of maturation, practice effects, or participation in the classroom curriculum.

In addition to the changes seen in test and probe scores, qualitative changes were observed by both the clinician/second author and Z's classroom teacher. For example, the second author noted that Z required less and less cueing and scaffolding to successfully answer the comprehension questions during the treatment activities. Additionally, his teacher commented that Z demonstrated "increased confidence during reading activities" and improved comprehension performance in the classroom after treatment began.

One last consideration with regard to the findings, especially from a public school therapy planning standpoint, is the change in inferential comprehension performance with respect to the treatment schedule. When considering how much therapy is necessary (i.e., treatment "dosage") for students with language/learning disabilities to be successful with a new concept or skill, this study provides some important insight and a direction for future research. Improvement was demonstrated after six sessions of treatment, indicating that learning can take place during this time frame. Worth noting too, though, is that more intervention time may be necessary to foster completely independent application of new information and strategies. In this era of treatment accountability, the issue of optimal treatment intensity is an important area of investigation.

There were several limitations to this study. First, the design would have been stronger with a multiple baseline across participants or behaviors, thereby providing better evidence to support treatment effects. A single participant limits generalizability and provides only a weak form of clinical evidence. Also, the school/student schedule prohibited a longer treatment period and efficient data-gathering, as we were only able to treat for 8 weeks and obtain one post-treatment withdrawal measure. There was also a risk for examiner bias as the second author was the only speech/language pathologist at the school and therefore completed all data collection. Additionally, it cannot be assumed that inferential comprehension ability would improve in children with other disabilities or that performance on the question-answering task in this study would generalize to other inferential tasks. Thus, this inferential comprehension intervention procedure should be investigated in a study with greater experimental control, a longer treatment period, and a variety of inferential comprehension tasks. Additionally, examining its use in an inclusive classroom setting would be a study with practical implications.

Lastly, as speech-language pathologists, we need to hold ourselves accountable for the success of our treatment programs (Damico, 1988; Meline & Paradiso, 2003; Zippoli & Kennedy, 2005). Clinical effects need to be demonstrated empirically, which can be a challenging process in school-based settings. As we seek to close the gap between the small evidence base of Level 1 and 2- studies in child language research (Cirrin & Gillam, 2008) and the actual research being conducted with primary and intermediate school-age children, we will need to explore how manageable but carefully designed individual treatment studies can serve as a realistic starting point. While speech/language pathologists in the schools are already gathering baseline data, implementing treatment as a result of the data, and measuring progress in consistent ways, they must now determine how to create additional experimental control and be ready to publish their findings. Given the logistics involved in providing this additional control, preliminary evidence demonstrating a treatment program's success can provide confidence that the intervention is worth the time and effort necessary for continued study and attainment of a higher level of evidence.

Language treatment studies are an increasingly important objective for clinicians in the public schools and, as this study shows, a doable endeavor in that setting. Data can be carefully collected and evaluated and intervention programs such as the Milosky and Ford (1996) inferential comprehension paradigm can, over time, become evidence-based options for school age children with language/learning disabilities.

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Appendix A: Pre-test, Treatment and Post-test Schedule (January-April)

Administration of pre-test measures

January 28, February 15

Baseline data collection

February 1, 4 and 11

Lesson and Withdrawal measure dates

2/18 Lesson 1

2/29 Lesson 2

3/2 Withdrawal 1

3/10 Lesson 3

3/20 Lesson 4

3/27 Withdrawal 2 (administered prior to Lesson 5)

3/27 Lesson 5

3/31 Lesson 6

4/7 Withdrawal 3

Administration of post-test measures

April 14

Appendix B: Example Stories (Steck-Vaughn Company, 1999) and Comprehension Questions

A New Name

Little Deer was tired of his name. It was a name for a young boy. Now that Little Deer was ten summers old, he no longer thought he was a little boy. Little Deer thought he was old enough to be given a powerful man's name. Little Deer knew he could not just change his name, so he talked to the elders of the tribe.

The elders of the tribe said Little Deer could earn a man's name by doing a brave deed. Little Deer could not think of a brave deed to do. Then one day Little Deer saw a wild horse charge toward his little sister. Without thinking of his own safety, Little Deer ran toward the horse, shouting and waving his arms. Just before the horse reached her, it turned away. The people of the tribe were so grateful to Little Deer that they changed his name to Wild Horse.

1. What was Little Deer tired of? (Literal)
2. Why did Little Deer think his name was for a young boy? (Inferential)
3. How old was Little Deer? (Literal)
4. Who did Little Deer talk to about changing his name? (Literal)
5. How do you think the people of the tribe thought of the name Wild Horse? (Inferential)
6. What did Little Deer hope to do by running toward the horse waving his arms? (Inferential)
7. What did the elders say Little Deer needed to do in order to change his name? (Literal)
8. Who was the horse charging toward? (Literal)
9. Why do you think Little Horse's sister didn't run away from the horse? (Inferential)
10. Why couldn't Little Deer just change his name? (Inferential)

Aunt Kate's Cottage

Lana and her family were packing the car. Today was the first day of summer vacation. Every year, for as long as Lana could remember, her family had gone to the lake for the whole summer. Lana's Aunt Kate owned a cottage there. She always had invited Lana's family to stay with her for the summer.

Lana loved to go to visit her aunt's cottage. It was surrounded by fir trees that were full of birds and their nests. Lana and her brother would spend all day swimming and fishing. At night they would cook dinner over a fire and tell stories by the lake.

As Lana looked out of the car window, she was both happy and sad. She was looking forward to spending the summer at the lake, but this would be their last summer there. Aunt Kate had decided to sell the cottage. She told the family she would keep it until the end of the summer. Then she was putting the cottage up for sale. Lana would miss the lake and the cottage very much. She promised herself that this summer would be the best summer of all at the lake.

1. How long do Lana and her family typically stay at the lake during the summer? (Literal)
2. Why did Lana promise herself to make this summer the best? (Inferential)
3. Who owned the cottage? (Literal)
4. How did Lana get to her aunt's cottage? (Inferential)
5. Where did Lana's family cook dinner? (Literal)
6. Who was always invited to stay the summer at the lake? (Literal)
7. What kinds of things did Lana and her family pack in the car? (Inferential)
8. How did Lana's family feel about visiting the cottage? (Inferential)
9. Why did Aunt Kate keep the cottage until the end of the summer? (Inferential)
10. How did Lana feel as she looked out the car window? (Literal)