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USING INSTRUCTION AND PRACTICE TO IMPROVE RECALL OF THEMATIC AND TEXT-BASED INFORMATION FROM ORALLY PRESENTED TEXTS

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

by

Paul R. Malanga, M.A.

*****

The Ohio State University
1997

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Comprehension of expository text is influenced by the amount of relevant background knowledge possessed by the reader. Directly teaching background knowledge in an attempt to improve recall of textual material and posttest scores over the reading topic have yielded mixed results. The purpose of the present study was to assess the effects of listening only, instruction and listening, and practice and listening conditions on the acquisition of correct thematic information points recalled in a one minute counting period. Six elementary age students served as subjects. All students experienced at least the listening only condition and the practice and listening condition. During the listening only condition, the experimenter would read a passage at a rate of 190-200 words per minute. The experimenter would then ask the participant to recall as many facts and points about the passage as they could in a minute. The experimenter would then ask the participant to say anything else about the topic that they knew in a minute. The same procedure was followed during the instruction and listening and practice and listening conditions.

During the instruction and listening condition, the experimenter used a background information sheet to guide his
instruction about the selected topic. During the practice and listening condition, the experimenter gave the background information sheet to the participants to read as many times they could in a minute. The amount of time devoted to instruction and practice was matched to eliminate any confound.

The results indicate that four of the six participants recalled more correct thematic information points during the practice and listening condition than they did during the listening only or instruction and listening conditions. Furthermore, the practice and listening condition produced frequency jump-ups and celeration turn-ups in correct thematic recalls with four participants compared with the listening only condition. These results suggest that requiring active responses on the part of students is more likely to result in higher levels of achievement compared with no responses being required. This is consistent with an established research base on active student responding.
Dedicated to my parents,
Paul and Mona Malanga
whose patience, love, and help in the early years
made this accomplishment possible
ACKNOWLEDGMENTS

The completion of this research would not have been possible without the help and cooperation of many different people, all who deserve to be acknowledged for their efforts.

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A big time thanks also goes out to Claire McDowell. Her help in collecting procedural integrity data served to increase the quality of this study in a big way. I am glad to have you as a friend. A thank you also goes out to Steven Logue and Craig Hirsch, who helped out when Claire was unable to. Everyday counted, and your help is much appreciated.

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FIELDS OF STUDY

Major Field: Education
Studies in: Applied Behavior Analysis, Special Education, Mental Retardation, Precision Teaching
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CHAPTER 1
INTRODUCTION

Adequate comprehension of prose passages is an essential academic skill (Smiley, Oakley, Worthen, Campione, & Brown, 1977). In fact, it could be argued that comprehension of connected text is the only reason we read. In other words, there is no point in reading if the reader does not understand what was read. A student may conceivably be able to read every word on a page, but not understand the meaning of the text (McCormick, 1995). To understand the meaning of the text, the reader must have sufficient background vocabulary knowledge with respect to the text. Further, to understand the topic or theme of the text, background knowledge of that topic or theme must exist. Comprehension then, may be defined as the use of prior knowledge to create new knowledge. Without prior knowledge, text is not only difficult to interpret, it is meaningless (Adams & Bruce, 1980).

Skill at comprehending important information from prose is a skill that distinguishes good from poor readers (Baumann, 1984). It has in fact been suggested that poor readers may suffer from a general comprehension skill
relevant background knowledge before beginning the reading activity is one of those ways.

The knowledge we possess in relation to any particular subject matter is called background knowledge. There is evidence supporting the notion that the more background knowledge we have before we read, the more we learn when we read (National Institute of Education, 1982). If this is true, it necessarily follows that lack of knowledge about a topic may hinder a reader's ability to understand the text (McKeown, Beck, Sinatra, & Loxterman, 1992). Said another way, we comprehend familiar topics better than unfamiliar topics.

For instance, Pearson, Hansen, and Gordon (1979) studied the effects of high and low prior knowledge on the comprehension of text by elementary age students. Twenty students participated in the study, 10 with high prior knowledge and 10 with low prior knowledge, as determined by scores obtained on a pretest. One week after the pretest was administered, the participants read a passage and answered twelve orally presented posttest questions. The results indicated that students with high prior knowledge correctly answered more questions requiring prior knowledge based on the passage than did the students with low prior knowledge.

If the assumption that background knowledge is requisite to effective comprehension of prose, and a lack of background knowledge impedes the comprehension process
is true, then it follows that teaching the necessary background knowledge should improve the comprehension process. Building background knowledge is, in fact, a common feature of instructional suggestions in basal reader teacher's manuals (Pearson & Fielding, 1991). Stevens (1982) conducted a study to test this hypothesis.

Stevens analyzed the effects of teaching background information on the number of questions answered correctly on a passage in the McCall-Crabbs Standard Test Lessons in Reading (1961) with 140 junior high school boys. Three classes, chosen at random, were taught a lesson on the Texan War, while the remaining three classes were taught a Civil War lesson. A next day test on the Alamo was administered to all the students. Those students provided with instruction on the Texan War scored significantly higher compared with those students provided with a lesson on the Civil War. These results support the hypothesis that teaching background information may ameliorate comprehension difficulties with some students.

The teaching of background knowledge can be conceptualized as teaching thematic units of information. It has been suggested that building a general background knowledge base may not be sufficient to improve comprehension. In fact, background knowledge about important story ideas or themes may influence comprehension ability to a greater degree than overall background
knowledge (Beck, Omanson, & McKeown, 1982). This makes intuitive sense.

Strategies to build background knowledge include prereading discussions (Hansen & Pearson, 1983), providing enrichment activities prior to reading (Thames & Readence, 1988), story preview (Graves, Cooke, & LaBerge, 1983), prereading writing activities using lists of main story events (McGinley & Denner, 1987), and story retelling (Koskinen, Gambrell, Kapinus, & Heathington, 1988; Morrow, 1984 & 1985; Morrow, Gambrell, Kapinus, Koskinen, Marshall, & Mitchell, 1986). The culmination of the above cited research, while certainly not comprehensive, yields one consistent result: engaging students in prereading activities designed to enrich their background knowledge, regardless of the strategy, is consistently correlated with improved comprehension of text. All of the cited studies, while focusing on the effect of prereading activities on comprehension, have not directly assessed the relationship between aural prereading activities (i.e., listening comprehension) and text-based (see/think or see/say) reading comprehension.

It is generally understood that there is a relationship between listening and reading comprehension skills (Smiley, et al., 1977; Sticht & James, 1984). The relationship between auding a text and it's transfer to reading a text has been assessed in a seminal study by Loban (1964). Loban found a positive correlation between
early language skills and reading ability in later grades. These correlations were stronger in later grade levels (i.e., grades 6 & 8). Smiley et al (1977) analyzed the effect of aural textual presentation and recall of thematically relevant material by adolescent good and poor readers. Their results suggest a correlation between auding ability and recall of thematically relevant material. A more recent study analyzed the effects of teaching thematic units, or background knowledge, on the recall of culturally related information.

Erwin (1992) used a pretest-posttest design to answer the following questions: (a) Is there a relationship between culturally related background knowledge and comprehension, and (b) Is direct instruction of thematic units an effective strategy for building background knowledge?

Two classes, a Scottish and a Texan class, listened to two passages, a culturally native and culturally foreign passage. After each passage, they responded to a ten-item multiple choice test. During the subsequent week, each class participated in a one week thematic unit about the foreign culture. The students then listened to the same passage about the foreign culture and responded to a multiple choice test. The results were mixed.

Regarding the relationship between culturally related background knowledge and its effect on comprehension, a significant effect of was found for the Scottish class but
not the Texan class. Specifically, the Scottish class was able to answer 70% of the questions related to Scottish culture correctly while the Texan class performed at chance levels on questions about Texas culture. Results were also mixed as to whether direct thematic instruction is an effective strategy for building background knowledge. The results indicate that thematic instruction was more effective for the Texan group than the Scottish group. Given the overall mixed results of this study, clearly more research is needed to assess directly teaching background knowledge and its effect on comprehension.

It has been suggested that there is a relationship between listening and reading comprehension (Smiley, et al., 1977; Sticht & James, 1984). Very little research exists, however, for studying the relationship between hearing a text read and the recall of information presented. Furthermore, if similar processes govern listening and reading comprehension as measured by the number of text-based and thematic information points recalled, then improvements in one should lead to improvements in the other (Smiley, et al., 1977; Sticht & James, 1984). The present study is proposed to test the relationship between these two processes.

Purpose of the Study

The purpose of the present study is to assess the effects of instruction and practice of thematic information points (i.e., background knowledge) on the recall of
thematic and text-based information points. This study will also assess the transfer or generalization of recall of thematic and text-based information points from a hear-to-say to a see-to-say learning channel set. The participants will listen to a one-minute timed recording of a passage at their grade level. They will then be asked to: (a) recall as much as they can remember from the passage in a minute, and (b) tell as much as they know about the topic discussed in the passage in a minute. Thus, there were two one-minute timings.

Research Questions
The following questions were the focus of this study:
1. What will be the number of correct and incorrect text-based and thematic information points recalled in a minute from an oral presentation of a passage?
2. What effects will an oral presentation of thematic information points by the experimenter have on the number of correct and incorrect text-based and thematic information points recalled in a minute?
3. What effects will practicing (see-to-say) thematic information points have on the number of correct and incorrect text-based and thematic information points recalled in a minute from an oral passage presentation by elementary age students?
4. What will be the number of correct and incorrect text-based and thematic information points recalled in a minute from a see-to-say learning channel set?
5. What effects will an oral presentation of thematic information points by the experimenter have on the number of correct and incorrect text-based and thematic information points recalled in a minute from a see-to-say learning channel set?

6. What effects will practicing thematic information points have on the number of correct and incorrect text-based and thematic information points recalled in a minute by elementary age students from a see-to-say learning channel set?
Strategies to improve the comprehension of connected text can take many forms. Comprehension activities can occur before (prereading activities such as previewing), during (teaching comprehension strategies), and after (recalling information) reading. The amount of background knowledge the reader possesses influences the comprehension process (Tierney & Cunningham, 1984). Background knowledge can take many forms, two of which are vocabulary and thematic knowledge. Vocabulary knowledge refers to knowledge such as sight word recognition and sight word comprehension (i.e., ability to state antonyms and synonyms). Thematic knowledge refers to any background knowledge the reader possess that is related to the text.

The purpose of the following literature review is to describe prereading activities that are designed to increase a reader's background knowledge and have been correlated with increases in reading comprehension, or, recall of information relevant to the reading. Prereading activities include developing essential vocabulary, story preview, and background information and key concepts (Kueker, 1990). Studies investigating the effects of vocabulary instruction, previewing texts, and directly teaching thematic background
knowledge will be reviewed. The review will end with a discussion of schema as conceptualized via hypothetico-deductive and inductive interpretations.

Text-Based Background Knowledge Instruction

Vocabulary Instruction

Teaching vocabulary for understanding involves more than requiring students to memorize words (Kueker, 1990). Words taught by: (a) modeling the meaning of words, (b) using synonyms, and (c) teaching definitions seems to facilitate the understanding of new words (Carnine, Silbert, & Kameenui, 1990). The assessment of vocabulary knowledge is often achieved via multiple choice tests and synonym production (Beck & McKeown, 1991). Word knowledge, then, consists partly of simple word recognition coupled with comprehension of sight words, or, said another way, understanding the "meaning" of the word. In fact, knowledge of word meanings has a strong relationship to reading comprehension (Stahl & Fairbanks, 1986).

Carr and Mazur-Stewart (1988) analyzed the effect of a vocabulary overview guide on vocabulary comprehension and retention with 49 junior college students. The students scanned text and identified unknown words. The students then wrote definitions in the text and read the passage containing the definition and unfamiliar words. Further, semantic maps were completed categorizing the new words and associating those words with the readers' background knowledge. Students
who were instructed using the vocabulary overview guide achieved higher scores on a posttest and 4 week delayed posttest than did students who only discussed and studied term definitions.

While the Carr and Mazur-Stewart study demonstrated, in part, that categorizing vocabulary terms and relating these terms to existing background knowledge facilitates the acquisition and retention of new words, they did not assess the effect of these strategies on the comprehension of connected text. Expanding the vocabulary repertoire of any student in and of itself is of limited utility if students cannot use the newly learned words in connected text reading. Beck, Perfetti, and McKeown (1982) assessed such a generality change.

Beck, Perfetti, and McKeown (1982) assessed the effects of differential exposure to target words and its effect on recall of connected text. Three frequency conditions, "none", "some", and "many", were established. In the none condition, words selected to match the some and many words on various dimensions occurred on the pre and post measures but did not occur in any instruction. In the some condition, 8 to 10 words were taught in daily vocabulary lessons for 5 days while in the many condition, a subset of the words from the some condition reappeared 16-22 times in the instruction of new words in subsequent weeks. Vocabulary instruction consisted of relating new terms to background knowledge via comprehension activities that included developing synonyms,
including the target words in sentence composition, and
describing behaviors associated with new terms. Fluency
building activities in the form of timed trials were also
included as part of instruction. Results indicate that the
many group evidenced larger gains in vocabulary knowledge as
measured by a standardized assessment than the some group.
Further, the many group recalled significantly more
information on a story recall task compared with the none
group.

Similarly, McKeown, Beck, Omanson, and Perfetti (1983)
studied the effects of unfamiliar compared with recently
taught words on comprehension of connected text. Vocabulary
instruction was provided for 5 months and was identical to
the vocabulary instruction described in Beck et al., (1982).
The control group received general language arts instruction.
Vocabulary knowledge was assessed using a multiple choice
test format, with the target word embedded in a sentence
followed with four brief definitions. The vocabulary
instruction group scored significantly higher on a posttest
of instructed words and recalled a greater proportion of
instructed words from connected text reading compared with
those receiving general language arts instruction. This
suggests that vocabulary instruction had a positive effect on
recall of connected text information than did the general
language arts curriculum.

The results of the above two studies are consistent with
the data base of effective vocabulary instruction.
Vocabulary instruction that includes contextual work and multiple modes of presentation have been shown to be effective instructional strategies for producing generalized effects (Beck & McKeown, 1991; Sternberg & Powell, 1983). These prereading activities, regardless of their effectiveness, are not always employed, even in commercially available reading materials.

In an attempt to build background information, some basal reading lessons include prereading activities in the form of cloze procedures requiring the insertion of specific vocabulary words in an attempt to build background vocabulary knowledge. Upon inspecting these prereading activities, Beck, McKeown, McCaslin, and Burkes (1979) concluded that they seem to lack a cohesive pattern necessary to facilitate comprehension. Moreover, many traditional basal reader formats include only a series of questions to be answered after the text is read in an attempt to build background knowledge (Reutzel, 1985). This practice is counter to what the research base suggests is best practice. But what exactly is the relative efficacy of these two basal reading practices? Thames and Readence (1988) conducted a study to answer this very question.

Thames and Readence assessed the relative efficacy of a traditional basal format (i.e., a cloze procedure) compared with two alternative lesson frameworks on recall of textual information. In a reconciled reading lesson (RRL), questions at the end of the story were presented as a prereading
enrichment activity to foster conceptual development of story content and background knowledge related to those concepts. A second prereading activity, termed list-group-label (LGL), consisted of presenting specific vocabulary words and requesting the students to generate a list of related words. To foster discussion of the target words, students developed lists of words in small groups. Results suggest that the reconciled reading lesson instruction produced greater gains in the identification of appropriate definitions on a posttest than did the list-group-label or conventional cloze procedure used in basal reading lessons.

The studies reviewed thus far indicate that comprehension may be affected by establishing vocabulary background knowledge before reading. Demonstrations to this effect have been suggested with connected text reading (Beck et al., 1982 & 1983) and identification tasks on multiple choice tests (Thames et al., 1988; Carr et al., 1988). These studies, however, have used as participants college students and elementary regular education students, respectively. What effect might vocabulary instruction have on learning disabled and remedial readers' vocabulary and passage comprehension?

Pany, Jenkins, and Schreck (1982) examined the effect of different levels of practice on the recall of synonyms with students in general education classes, learning disabled students, and students identified as remedial readers. Synonyms were either extracted from context with no direct
instruction provided, provided by the experimenter, or practiced by the student. Across all conditions and student samples, more correct isolated synonyms and paraphrased sentences were provided for terms in the practice condition compared with the meanings from context and meanings given conditions. These results are consistent with the active student responding literature that has shown student achievement to be a function of the students' active engagement with the instructional material (Heward, 1994).

A consistent finding in the above research is that prereading vocabulary instruction increases the comprehension of connected text and synonym production. While the increase in the amount of textual information recalled and number of vocabulary words in a person's repertoire enhances the likelihood of understanding more and different types of texts, drawing causal relations among events within the text is a different skill altogether. None of the studies have evaluated the effects of vocabulary instruction on the identification of causal relations in connected text. Moreover, the above studies have used narrative text. Students in most classrooms are required to read expository texts. These two variables limit the generality of the results of the studies thus far reviewed.

Medo and Ryder (1993) examined the relation between teaching text specific vocabulary on the comprehension of expository texts and the ability of eighth grade student's to make causal connections. Students in the vocabulary
instruction group reviewed the previous days words, made semantic maps, discussed relationships among map features, and wrote summary paragraphs about the topic. Direct instruction and guided practice in self-generated questioning were provided to a control group. Regardless of ability, students receiving vocabulary instruction identified more causal relations on a comprehension posttest than subjects who did not receive vocabulary instruction.

The primary dependent measure of all the studies reviewed has been on the magnitude of the change on outcome scores to posttest comprehension questions compared with pretest scores. The magnitude of pretest to posttest change has been a measure of treatment effectiveness. This is somewhat of a directional analysis, however, in that it implies a simple causal directional relation. Specifically, vocabulary instruction as a prereading activity results in greater comprehension, as measured primarily by synonym identification and production, vocabulary words recalled, and number of comprehension questions answered correctly on a multiple choice posttest. The comprehension process, however, is more dynamic than these studies suggest. An important variable has been neglected. That variable is text difficulty.

Cunningham and Moore (1993) investigated the relation between the understanding of the vocabulary used in comprehension questions and the level of comprehension as measured by a posttest requiring written responses to open-
ended questions. Questions containing academic vocabulary resulted in 7.6% lower comprehension scores than did equivalent questions using nonacademic vocabulary, suggesting comprehension scores to be a function of textual difficulty rather than lack of knowledge of the subject matter being assessed.

If the vocabulary of comprehension questions can adversely affect recall of textual material, it would be reasonable to expect difficulty of the text itself to influence the reader’s ability to recall passage information. As will be reviewed in the next section of this literature review, teaching background information has resulted in improved recall of textual information. What are the parameters of effectiveness of teaching background information on text recall? Stated another way, how might the introduction of a second variable influence the effectiveness of teaching relevant background knowledge? Specifically, to what extent might preteaching relevant domain background information have on ameliorating potential comprehension difficulties with difficult text?

Stahl, Jacobson, Davis, and Davis (1989) studied the effects of text difficulty and background knowledge instruction on the recall of story events. All students received a 15-minute content relevant or content irrelevant lesson. Following the lesson, all students read either a difficult or easy passage. Students who received content relevant instruction recalled significantly more information
than those who received content irrelevant instruction with the easy text. Preteaching relevant information, however, did not serve a compensatory function for difficult vocabulary.

While the constancy of the results of these studies unequivocally demonstrates the efficacy of vocabulary instruction on comprehension, vocabulary instruction is only one prereading instructional activity that can be used to improve recall of connected text information. Previewing texts before reading is another successful strategy. Previewing texts can involve prereading questions, class discussion, story synopsis, and sequentially listing important terms associated with story events. It is these strategies to which the literature review will now focus.

Previewing Texts

As was the case with vocabulary instruction, previewing activities also build background knowledge prior to reading and have been correlated with increases in comprehension of text content. By definition, previews are introductory material presented to students before they read specific selections (Graves, Cooke, & Laberge, 1983). Story previews attempt to link story events to the readers' experiences (Pearson & Fielding, 1991).

Graves, Cooke, and Laberge (1983) assessed the effects of previewing difficult short stories on low ability junior high school students' performance on a multiple choice
comprehension posttest. Previews consisted of multiple questions designed to peak the students' interest, class discussion, a story synopsis, and a vocabulary review. Students performed significantly better on posttests with stories that were prefaced with the preview activities compared with stories in which no preview was conducted.

McCormick (1989) also assessed the effectiveness of previews on the comprehension ability of more and less skilled readers. Unlike the Graves et al. study, McCormick used expository texts. Preview activities consisted of questions to arouse student interest, a synopsis of the passage, and a list of vocabulary words found in the passage. The teacher asked each question on the list and evoked student responses. Both groups of students answered more questions correctly on the posttest when preview activities were provided than when they were not. Specifically, more and less skilled readers' posttest scores increased by comparable amounts, 15% and 16%, respectively.

The McCormick study is important because it extended the generality of the effectiveness of previews across passage type. Further, the preview activities reported took approximately 10 minutes to conduct. This is important because it establishes the viability of conducting preview activities as a routine part of whole group instruction in the ongoing confines of prevalent classroom activities. Preview activities, as McCormick pointed out, are instructional packages, consisting of multiple components.
including, but not limited to, story synopses, prereading questions, student-directed, and teacher-directed presentations. Research has either focused on expository or narrative text when assessing the effectiveness of any previewing activity. Both have not been directly compared in the same study. Research assessing components of previewing activities on the comprehension of expository and narrative text, then, would provide a needed extension to the literature base.

Dole, Valencia, Greer, and Wardrop (1991) investigated the effects of teacher directed and interactive previewing activities across expository and narrative texts with fifth grade students. In the teacher directed condition, teachers provided students with important information in upcoming texts. Teachers activated and discussed students' prior knowledge about upcoming topics in the interactive condition, and simply required the students to read the text and answer questions in the no preview condition. The results indicate that the teacher-directed strategy was more effective in increasing passage-specific comprehension and recall than the interactive strategy across text types.

One assumption of schema theory is that the reader develops an understanding as they revise their predictions of what will occur while reading (Anderson & Pearson, 1984). A practice commonly seen in many previewing activities, however, is the provision of large amounts of story content in an attempt to improve comprehension scores. This leaves
little information for the reader to verify since a good amount of information has already been provided.

A preview procedure that differs in the amount of information "given away" was developed by McGinley and Denner (1985) and is called story impressions. The story impressions procedure differs from other previewing techniques in that it provides only key words listed in sequence of occurrence of events to which those key words are associated.

Story impressions influence the readers comprehension in three different ways. First, story impressions prompt readers to predict what will happen by providing fragments of actual text content. Second, since key terms are listed in the order of occurrence, students are provided with a sequentially systematic set of clues. Finally, students are asked to compose a story based on the key word clues provided (McGinley & Denner, 1987).

McGinley and Denner (1985) assessed the effects of the story impression preview technique on the recall of story information. Students were provided with a list of key terms and asked to write a story based on those key terms. The following day, the students reread their story and then read the actual text for the first time. The results indicate that those students who engaged in the prereading/writing activity correctly answered more posttest literal and inferential comprehension questions than those who simply read the story and answered questions.
The comparison made in the above study involved preview and no preview control group. This is a weak comparison because one can argue that doing anything will produce better results when compared with doing nothing. Perhaps a stronger case could be made for the efficacy of any treatment when compared with an active alternative treatments experimental design (Cooper, Heron, & Heward, 1987).

Bligh (1990) examined the relative effectiveness of the story impression method compared with a prereading teacher-led discussion method with narrative text. Students who received training with the story impression method wrote a class predicted story on an overhead projector. After listening to the story, retelling was written as a class in the same manner. Students in the control group speculated about the stories content using only the title. After reading the story, they also wrote a retelling of the story. Students receiving training on the story impressions method scored higher on written retells than did the teacher-led discussion group. These results suggest that the story impression writing activities may sensitize the students to the actual story events and partially account for the greater content in the written retells.

That the Bligh study assessed two prereading activities, story impressions and teacher-led discussions, provides stronger evidence for the efficacy of the story impression method as a viable alternative previewing strategy. McCormick's observation that prereading activities consist of
treatment packages applies to the story impression method as well. Since the above studies did not conduct a component analysis of the story impression method, it is impossible to determine the differential effectiveness of each component. An experimental analysis of the story preview components would provide important information as to what the functional variables are that produce improved recall of text-based information.

Denner and McGinley (1992) examined the effectiveness of the story impressions preview activity with and without the writing component with junior high school students. Students who did not compose a story listed their predictions about the story. A third group read the story without any prediction activity. The results supported the story impressions plus composing prereading activity as the most effective preview strategy for both above and below average readers.

Both vocabulary instruction and previewing texts are both prereading strategies for building background knowledge to enhance comprehension (Tierney & Cunningham, 1984; Beck & McKeown, 1991). Research has supported a causal relationship between background knowledge and comprehension (Tierney et al., 1984). Background knowledge, however, is a very inclusive term. It includes not only text-based knowledge, or knowledge explicitly related to the text, but also thematic knowledge, knowledge implicitly, or, more remotely related to the text.
Thematic Background Knowledge Instruction

It is well established that prior knowledge of the subject matter facilitates comprehension (Pearson et al., 1979). As reviewed above, Stahl et al., (1989), demonstrated that teaching domain background knowledge was correlated with improved recall of domain information with easy text. Teaching background knowledge did not, however, compensate for the deleterious effects of difficult vocabulary on comprehension. While the results of this study are instructive, it did not assess the degree of background knowledge present before domain instruction occurred. For instance, what effect does a high and low degree of relevant background knowledge have on literal and inferential recall of textual information?

Pearson, Hanson, and Gordon (1979) assessed the effects of degree of background knowledge on the performance on an orally presented posttest. The posttest consisted of twelve questions, six textually explicit and six textually implicit. Those students in the high prior knowledge group recalled more overall correct information than those scoring in the low prior knowledge category. Further, those in the high prior knowledge group answered more implicit questions correctly compared with the low prior knowledge group.

Similarly, Fincher-Kiefer (1992) studied the effects of different levels of domain related knowledge on the reading time of sentences requiring different degrees of background knowledge and posttest performance with college students.
Based on pretest performance, students were divided into low, intermediate, or high baseball knowledge groups. Two types of inferences, local and global, were assessed. A local inference is required to establish coherence at the text level while a global inference can only occur if a sufficient degree of background knowledge is present before reading. Results indicate that those with high and intermediate background knowledge read global inference statements faster than students in the low knowledge group. This suggests that the high and intermediate knowledge groups possessed an already established knowledge base that facilitated comprehension of such sentences.

To measure inference generation, which requires a certain degree of text comprehension, a cloze procedure was used requiring subjects to either write or say the critical missing word. The high knowledge group correctly completed significantly more global inference sentences than did either the intermediate or low knowledge groups. These results are consistent with the assumption that domain specific, or thematic knowledge, influences the degree and type of inferences made about a text.

Both the Pearson et al. (1979) and Fincher-Kiefer (1992), studies demonstrated that those students who bring a higher level of relevant thematic background knowledge to the reading session recall more implicit and explicit information compared with those readers who possess little thematic background knowledge. As previously mentioned, text
difficulty also affects comprehension of text. Related to this dimension of the reading process, would improvement in background knowledge compensate for different levels of text coherence?

McKeown, Beck, Sinatra, and Loxterman (1992) conducted a study with fifth graders assessing the effects of teaching thematic background knowledge on the recall of information and the number of correctly answered open-ended posttest questions across coherent and less coherent text. All students received prereading instruction that provided background knowledge directly relevant to the text. Students were then randomly assigned to read either the original or revised text. Textual revisions altered the original text so as to increase the coherence of the text by clarifying, elaborating, and explaining main points of the passage. The results showed that students recalled more information and answered more questions correctly with the revised text compared with the original text. This suggests that a prereading knowledge lesson did not compensate for lack of textual coherence. These results are consistent with the Stahl et al. (1989), study that indicated thematic instruction improved domain knowledge but did not compensate for vocabulary difficulty, indicating that these two processes operate independently.

The results of the above studies suggests certain limitations of teaching background knowledge and its ability to influence comprehension of connected text. A consistent
result seen thus far indicates that teaching background knowledge may improve recall of thematic information. This prereading strategy does not, however, compensate for incoherent or difficult text. Said another way, it is not a panacea for poorly designed instructional materials. There are many dimensions to consider in the prereading instruction process. One important dimension of this prereading strategy was not analyzed in the above studies. Specifically, what is the best prereading instructional strategy to teach background information?

Clifton and Slowiaczek (1981) analyzed the effect of two learning conditions, reading a passage or reading a list of information, on number of inference statements stated. The latency of the subjects' response to a related (true) or unrelated (fictional) sentence about a famous person was assumed to indicate the degree of integration of new knowledge with existing background knowledge. Related passages evoked an inference statement faster than did unrelated passages. Furthermore, presenting a prereading list had no effect on inference statements. Stated another way, the more similar the test statements were to the actual passage read, the shorter the latency to identify the test statements as either true or false.

Hanson and Pearson (1983) compared the effects of prereading discussions that associated students' background knowledge with events in the text and traditional basal prereading instruction on good and poor readers' ability to
draw inferences. Two types of questions were asked for three main ideas of the passage, resulting in six total questions. The first question type required the readers to relate personal experiences to hypothetical events while the second question required an inference statement predicting what might happen in the text under similar circumstances. Postreading discussions required responses to ten inferential questions presented orally. The control group received prereading instruction as directed by the basal reader manuals. Results indicate that there was little difference between good readers' scores in the experimental or control groups on a comprehension posttest. The experimental method did, however, enhance the literal and inferential comprehension of poor readers compared with students in the control group.

The results of the above studies have implications for classroom instruction. They seem to suggest that the more similar the instruction is to the assessment instrument, the more likely it is that the instruction will be successful in teaching a desired class of skills. This is an important piece of information, especially when instructing reading skills. These results are consistent with the results obtained in the McKeown et al. (1992) study that found more posttest questions were answered correctly by students reading a revised text that was assumed to be less ambiguous than the original text. These studies further imply that relating background knowledge to the text and practice
answering inferential questions improves recall of implicit and explicit information. Simply stated, when attempting to integrate new information with existing knowledge, explicit direct instruction is required.

Stevens (1982) assessed the effect of directly teaching background knowledge on the performance of tenth grade boys on a next day test. Six history classes were included in the study. A lesson on the Texan War was taught to three classrooms chosen at random, while the remaining three classrooms were taught a lesson on the U.S. Civil War. The following day, all subjects read a passage on the Alamo and took a posttest. The students receiving the Texan War lesson scored significantly higher on the posttest than did the students receiving a lesson on the U.S. Civil War.

A more recent study analyzed the effects of teaching thematic units on the recall of culturally related information. Erwin (1992) conducted a cross-cultural study to assess the effects of direct instruction of culturally related thematic units on the posttest performance of elementary Texan and Scottish students. Given that it is generally understood that there is a relationship between listening and reading comprehension skills (Smiley et al., 1977; Sticht & James, 1984), the students' listened to the passages. This also controlled for differences in reading ability.

Two classes, a Scottish and a Texan class, listened to two passages, a culturally native and culturally foreign
passage. After each passage, they responded to a ten-item multiple choice test. During the subsequent week, each class participated in a one week thematic unit about the foreign culture. The students then listened to the same passage about the foreign culture and responded to a multiple choice test. The results were mixed.

The amount of native background knowledge possessed was found to have a significant effect for the Scottish class but not the Texan class. Specifically, the Scottish class was able to answer 70% of the questions related to Scottish culture correctly while the Texan class performed at chance levels on questions about Texas culture. Results were also mixed as to whether direct thematic instruction is an effective strategy for building background knowledge. The results indicate that thematic instruction was more effective for the Texan group than the Scottish group. Given the overall mixed results of this study, clearly more research is needed to assess directly teaching background knowledge and its effect on comprehension.
Schemata

Hypothetico-Deductive Reasoning

This literature review has focused on the effect of background knowledge on the comprehension process. Variables such as vocabulary knowledge, text difficulty, and overall prior knowledge about a subject area, or thematic background knowledge, have been shown to influence a reader's understanding of what they read. The background knowledge a person possesses is known by most reading specialists as the person's schemata (McCormick, 1995).

A person's schema is an abstract knowledge structure (Wilson & Anderson, 1986). The concepts that constitute a schema provide slots that can be instantiated with specific information (Wilson et al., 1986). For instance, a person's schema about the christening of a ship may include a new ship, a bottle broken on the bow, it is done just before launching, by a celebrity, and in a dry dock (Anderson & Pearson, 1984). Each of these pieces of information would conceptually "fill a slot" in the person's ship christening schema. The extent and quality of a person's ship christening schema would affect their understanding and interpretation of a text discussing the christening of a ship (Anderson & Pearson, 1984; National Institute of Education, 1982; Wilson et al., 1986). Hence, the knowledge a person brings to a text can be considered a principal determiner of how that text will be interpreted and what may be learned or remembered (Wilson et al., 1986). Moreover, there is some
evidence to suggest that a faulty schema, or misconceptions about a subject matter, may have adverse effects on the comprehension process.

Hynd and Alvermann (1986) studied the effects of refutation and nonrefutation text on the number of correct information units recalled. Refutation texts were in contrast with a student's beliefs as determined by a pretest while nonrefutation texts were consistent with the student's preconceived notions about the subject matter. The results indicate that students who read the nonrefutation text recalled more correct information units in a postreading free recall writing activity than did those students who read the refutation text. These results suggest that inconsistent beliefs about a subject matter in relation to textually presented information may impede the comprehension process.

From a schema-theoretic perspective, the reason that readers may have difficulty recalling text information that is inconsistent with their existing schema is because the information presented does not fit with their existing schema of the topic. The information is, in fact, in contrast with the existing slots of information that make up that schema. Depending on how ensconced the information is in the schema, the existing schema may override the inconsistent information presented in the text (Hynd & Alvermann, 1986).

A person's schema serves a number of different functions. Some of the functions include ideational scaffolding, orderly searches of memory, enabling inferential
elaboration, and inferential reconstruction (Wilson & Anderson, 1986). Ideational scaffolding refers to the informational slots that make up a person's schemata with respect to a given topic. These slots provide a structural organization of the information that help the reader construct meaningful and organized units of information (Wilson et al., 1986; McCormick, 1995). This organized set of information also facilitates informational recall, or memory. Writers necessarily, however, assume a certain degree of prior knowledge on the readers part (Hirsch, 1988). This limits the amount of information readily available to the reader and places greater importance on the reader's background knowledge to "fill in" the missing pieces of information.

Reading difficulties can, at least in part, be assumed to be directly related to a reader's insufficient background knowledge (Anderson et al., 1984). The extent to which the reader possess a certain degree of background knowledge affects the reader's ability to understand what is written. This requires the ability to go beyond the literally stated information to complete the meaning of the text (Wilson et al., 1986). Said another way, a certain amount of inferential elaboration and reconstruction is required. This is supported by the Pearson et al. (1989) and Fincher-Kiefer (1992) studies that demonstrated students with greater degrees of background knowledge recall more information than those with less background knowledge.
While a schema-theoretic notion of comprehension seems intuitively plausible, one must remember that all the components that make up this view are constructs. They are the result of hypothetico-deductive reasoning models (Skinner, 1950). Said another way, their existence is the result of an inference made from observable behaviors. These behaviors are verbal behavior.

Inductive Reasoning

We tend to make tentative or hypothetical statements about a subject matter when, for whatever reason, it is inaccessible (Skinner, 1969). If an observable event, behavior, conforms to the theorems we have developed to explain the unobservable event, our theorem is said to be confirmed which then presumably provides support for the existence of the unobservable event (Skinner, 1969). Hypothetico-deductive reasoning refers to, "[A]ny explanation of an observed fact which appeals to events taking place somewhere else, at some other level of observation..." (Skinner, 1950, p. 193). The schema-theoretic notion of comprehension is an example of a hypothetico-deductive reasoning model.

What exactly are schemata and where do they exist? The first part of the question can be answered, but the second part cannot. Schemata are said to be abstract knowledge structures that consists of slots of information that helps organize information and facilitate recall (Anderson et al., 1990).
The evidence is ostensibly the recall of textual information, whether it be an oral sequence of words or a written product. Yet the orderliness of the relations among the units of information recalled is what is used to describe the "structure" and function of a schema. What is actually described is the orderliness of the recall of information, an observable behavioral phenomenon. The schema theorist observes some products or byproducts of the operation of the schema, but the processes themselves are not directly observed (Skinner, 1969). As stated by Skinner, "A purely behavioral definition [and description] has the advantage that the problem of mental observation is avoided and with it the problem of how a mental event can cause a physical one." (p. 194). The behavior of interest in the present analysis is verbal behavior.

Verbal behavior is not restricted to the common notion of speaking with another person. Verbal behavior is any behavior reinforced through the mediation of other persons (Skinner, 1957). There are a number of classes of verbal behavior including the verbal operants called mands, tacts, echoics, intraverbals, and other verbal behavior such as autoclitics. The present analysis will focus on the intraverbal relation given its relevance to the current subject matter. Before proceeding to the analysis, a preliminary distinction between the concepts of "instance" and "class" will help put the analysis into perspective.
The notion of instances and classes can be clarified through an analogy. A class is analogous to the concept of species in biology, while an instance is analogous to an individual within the species (Skinner, 1969). Individual responses, such as responses to the prompt, "Tell me as much as you can remember", are part of classes of responses. Classes of stimuli and responses are defined functionally, or by the common effect they have on the environment (Cooper et al., 1987). Said another way, it is the contingent relation between a stimulus complex, a dimension of an instance of a response, and reinforcement that is contingent on that dimension that defines a response class (Skinner, 1969). Hence, saying "tell me as much as you can remember", a common postreading probe designed to elucidate the effects of degrees of different classes of knowledge, is embedded in a reading episode, and is itself part of a stimulus class that evokes a class of responses relevant to the reinforcement established by the circumstances under which the responses are evoked. It is to this class of responses that the analysis now turns.

An intraverbal response shows no point-to-point correspondence with the stimuli that evoke them (Skinner, 1957). Said another way, an intraverbal is a verbal operant whose controlling variable is a verbal stimulus which has no point-to-point correspondence between the verbal stimulus and the behavior. Point-to-point correspondence occurs when subdivisions of a stimulus control subdivisions of a response.
(Michael, 1982). For instance, reading the text "Charlie ran home" is an example of a response with point-to-point correspondence. Each word emitted corresponds to each word on the page. Alternatively, asking, "Where did Charlie go", and receiving the response, "Charlie ran home", is an example of an intraverbal response. There is no point-to-point correspondence with the response "Charlie ran home" and the stimulus that evoked it, "Where did Charlie go?". The same holds true for responses evoked by either a cloze procedure or the "tell me as much as you can remember" probe, which are common assessments of comprehension. To conduct this analysis, I will use the ship christening example provided earlier in the review.

The ship christening schema was said to have slots instantiated with information such as a new ship, a bottle broken on the bow, it is done just before launching, by a celebrity, and in a dry dock (Anderson & Pearson, 1984). Each of these informational components made up the ship christening schema. Using the information slots metaphor, however, does little to advance our understanding of how to produce a wider thematic verbal class of responses because we cannot manipulate a schema. We can, however, manipulate the variables of which a wider verbal repertoire are a function. As an alternative to the information slot metaphor, consider the following.

A stimulus is presented, "tell me about ship christenings", for example. This is a probe that will evoke
multiple responses that are thematically related to that probe. The stimulus can be considered thematic because it refers to a specific class of events, ship christening. It is a probe because reinforcement is contingent on any response that is thematically related to ship christening, as compared to a specific response. In other words, the "correct response" is not predetermined. Any response, as long as it fulfills the minimum requirement of maintaining a thematic relationship, is sufficient for reinforcement (Skinner, 1957). If the intraverbal ship christening response class is small, very few relevant responses will be evoked. It necessarily follows then, that directly teaching information that is part of that class would be beneficial. A behavioristic analysis such as this has applied clinical value.

Using the behavioristic analysis as a guide to practice, the practitioner conducts an analysis of observable events, such as the relationship between the instructional material and the responses it evokes. This is a more parsimonious analysis than the hypothetico-deductive schema-theoretic view of the comprehension process. An incomplete intraverbal repertoire would not, then, be a sign of a defective schema, but rather a limited instructional history that can be ameliorated through further instruction. Erwin (1992) demonstrated this in her cross cultural study of Scottish and Texas elementary age students.
Before teaching a thematic unit on Scotland, for instance, Texas elementary age children listened to a passage about Scotland and took a 10-item multiple choice pretest. After teaching a thematic unit on Scotland, the children listened to the same passage and took the same 10-item multiple choice test. More questions were answered correctly following the instructional unit on Scotland compared to their pretest performance. A behavioristic interpretation for this improvement is that more intraverbal relations were established as a result of instruction. More research analyzing the variables responsible for the improvement in such verbal relations is needed, however.

Summary

As noted in the introduction, there is evidence to suggest a relationship between listening and reading comprehension (Smiley et al., 1977; Sticht & James, 1984). Very little research exists, however, for studying the relationship between hearing a text read and the recall of information presented. Erwin's study is one of the few that were found. Clearly there is a need for further research in this area. As suggested in the above analysis, teaching information units relevant to a particular theme should produce a larger thematic verbal repertoire. The present study will attempt to identify variables associated with increases in a students' intraverbal relations, or, said another way, thematic background knowledge.
CHAPTER 3

METHOD

This section describes the children, setting, experimenter, procedures, and experimental design used in the study. The dependent and independent variables are defined and their measurements are discussed.

Participants

Four girls and two boys served as participants. They were between the ages of 9 and 11 years of age and were in fourth grade. The participants were selected by asking the teacher to identify students he thought would benefit the most from extra reading instruction. An additional criterion for inclusion in the study was the childrens' agreement, with parental permission, to participate in the study.

Permission slips were sent to the parents of each child targeted for participation in the study. These forms provided basic information outlining the intent of the study and background information concerning the experimenter (Appendices A and B provide examples of the letter to parents and consent forms). The return of all signed permission slips was required before data collection began. Additionally, the experimenter received permission to conduct the study from the elementary principal (Appendix C provides
<table>
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<th>Age(^b)</th>
<th>Prof(^c)</th>
<th>Prd(^d)</th>
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<td>183</td>
<td>8-2(^e)</td>
</tr>
</tbody>
</table>

Table 3.1: Child Information

a) Diagnosis: SLD (Specific Learning Disability).

b) Child's age at beginning of the study by years and months.


d) Total reading national percentile rank-stanine scores from Metropolitan Achievement Test (7th ed). Scores in () indicate reading comprehension subtest scores.

e) Reading comprehension subtest score. Due to lack of test information, total reading scores were unavailable.
an example letter) and school district before the investigation began. Table 3.1 provides a summary of the basic demographics and assessment information for each child. 

Participant 1 - Robin

Robin was a 10 year, 8 month old female who was referred to participate in the study by her teacher because of difficulty reading grade level material. According to the Metropolitan Achievement Test (7th ed), Robin scored in the second percentile in the total reading category, which is an aggregate score of vocabulary, reading comprehension, and passage comprehension, while scoring in the eleventh percentile on the reading comprehension subtest.

Participant 2 - Donna

Donna was a 10 year, 8 month old female who was referred to participate in the study by her teacher because of difficulty reading grade level material. Due to a lack of information, percentile ranks for total reading were unavailable for Donna. Therefore, a reading comprehension subtest score is provided. According to the Metropolitan Achievement Test (7th ed), Donna scored in the fifteenth percentile on the reading comprehension subtest. Donna was identified as learning disabled and had a current individualized education plan with goals for improving her expressive and receptive vocabulary skill domains including recall of spoken sentences.
Participant 3 - Michelle

Michelle was a 9 year, 8 month old female who was referred to participate in the study by her teacher because of difficulty reading grade level material. Due to a lack of information, percentile ranks for total reading were unavailable for Michelle. Therefore, a reading comprehension subtest score is provided. According to the Metropolitan Achievement Test (7th ed.), Michelle scored in the second percentile on the reading comprehension subtest.

Participant 4 - Andy

Andy was an 11 year, 6 month old male who was referred to participate in the study by his teacher because of difficulty reading grade level material. According to the Metropolitan Achievement Test (7th ed.), Andy scored in the second percentile in the total reading category while scoring in the fifteenth percentile on the reading comprehension subtest.

Participant 5 - Ken

Ken was a 9 year, 7 month old male who was referred to participate in the study by his teacher because of difficulty reading grade level material. According to the Metropolitan Achievement Test (7th ed.), Ken scored in the tenth percentile in the total reading category while scoring in the twenty-sixth percentile on the reading comprehension subtest.

Participant 6 - Tammy

Tammy was an 11 year, 3 month old female who was referred to participate in the study by her teacher because
of difficulty reading grade level material. Due to a lack of information, percentile ranks for total reading were unavailable for Tammy. Therefore, a reading comprehension subtest score is provided. According to the Metropolitan Achievement Test (7th ed), Tammy scored in the eighth percentile on the reading comprehension subtest. Tammy was identified as learning disabled in the reading and writing skill domains. Tammy's current individualized education plan provided additional tutoring and extra time on exams. The latest intelligence test available was the Stanford Binet Intelligence Scale (4th ed.) administered in Spring, 1994. Tammy's composite IQ score was 88.

Setting

The study was conducted in the basement of an inner-city elementary school located in a large, midwestern, metropolitan area. The study was conducted between the hours of 9:30 a.m. and 11:30 a.m. and 12:40 p.m. and 3:00 p.m., Monday through Friday. All the students who participated in the study were in the same classroom. The basement was used for a number of different activities so it was not uncommon to have another activity being conducted in another part of the basement.

The order in which each participant was selected depended on the individual's school and classroom schedules. The classroom teacher worked separately with three reading level groups and participants' were pulled from their
classroom while either waiting for formal instruction to be delivered to their assigned reading group or during individual reading time.

**Experimenter and other observers**

The experimenter is a doctoral candidate in the Special Education and Applied Behavior Analysis program in the School of Physical Activity and Educational Services at The Ohio State University. He has seven years of experience working with children and adults with developmental handicaps who exhibit challenging learning and behavior problems.

The experimenter implemented the intervention strategy during the course of study and served as the primary data collector. A doctoral and master's student from the school of Physical Activities and Educational Services were used in this study to assess the accuracy of measurement of the dependent variable. Audiotapes were randomly chosen for assessment that consisted of listening to and scoring the occurrence of the dependent variables. Examples and nonexamples of the dependent variable were reviewed before the beginning of the study. A visiting graduate student from Ireland served as a secondary observer to assess the procedural integrity of the independent variable manipulations. The experimenter trained this observer in the procedural details by demonstrating the correct execution of each step in the procedure. She had previous experience assisting with experimental investigations.
Definition of the Dependent Variables

Four dependent variables were measured in this study: (a) correct text-based information points, (b) incorrect text-based information points, (c) correct thematic information points, and (d) incorrect thematic information points.

Correct and Incorrect Text-based Information Points

A correct text-based information point is a verb, noun, or adjective that possesses point-to-point correspondence with a word or phrase in the text or is synonymous with a word or phrase in the text. For example, given the text:

The President of the United States is Bill Clinton and he moved from Little Rock, Arkansas to Washington D.C. and he lives in the White House.

If the participant then recalled, "The President lives in the White House and his name is Bill Clinton and he lives in Washington, D.C. and Washington D.C. is the nation's capital. He moved from Lincoln, Arizona and every year cherry blossoms bloom and there are a lot of flowers and a lot of people visit things in Washington, especially the Eiffel Tower.", he would receive credit for seven correct text-based information points that includes: a) President, b) White, c) House, c) lives, d) Bill, e) Clinton, and f) Washington D.C.

Incorrect text-based information points are those points recalled that are erroneous recalls of text-based information (i.e., substitution errors). In the above recall example, he
Correct and Incorrect Thematic Information Points

The primary dependent variable is the number of correct and incorrect thematic information points said per minute. A thematic information point is a verb, noun, or adjective that is contextually or thematically related to the topic being taught but does not possess point-to-point correspondence with a word or phrase in the text (Michael, 1982). Using the above example, the participant would have received credit for eight correct thematic information points including: a) cherry, b) blossoms, c) bloom, d) flowers, e) people, f) visit, g) nations, and h) capital.

An incorrect thematic information point would be an information point that is unrelated to the topic being taught and does not possess point-to-point correspondence with a word or phrase in the text. Again, using the above example, one incorrect thematic information point would have been scored, Eiffel Tower. Since the Eiffel Tower is thematically related to Paris, France, and not Washington, D.C., it is considered an incorrect thematic information point.

Measurement of the Dependent Variables

Text-based information points

Correct and incorrect text-based information points were counted during 1-minute assessments. All verbs, nouns, and adjectives from each passage were listed on an answer sheet.
(Appendix D). The experimenter read each passage at a rate of 190-200 words per minute for one minute. This range is an established performance standard for precision teachers. After the students' listened to the passage, the experimenter or participant pressed the play-record button on the tape recorder and stated the date. The experimenter asked the participant to, "Tell me as many facts and points about the passage you just heard in a minute." At the completion of the one minute timing, thematic information points were measured.

**Thematic information points**

After recalling text-based information, the experimenter asked the participant to, "Say anything else about (e.g., crickets) that you know. Ready, begin." Correct and incorrect thematic information points were counted during 1-minute assessments. The students' thematic recalls were audiotaped to determine the exact number of thematic information points the student said. At the end of the one minute timing, the tape recorder was turned off and the experimenter thanked the student for participating.

**Accuracy and Believability of Measurement**

**Accuracy of Measurement**

Before the study began, the experimenter trained two observers to identify text-based and thematic information points and record the responses on an experimenter developed answer sheet. The training sessions consisted of the
experimenter (a) describing the purpose of the study, (b) explaining and giving examples of the dependent variable definitions, and (c) providing the observer practice in identifying and scoring each dependent variable. Multiple passages from *What happened to the dinosaurs?* (Branley, 1989) were used as the training texts. The primary experimenter and secondary observer(s) listened to a training passage and scored the occurrence of the dependent variables. The training passage was a passage recorded as part of prebaseline training sessions with a book not chosen for inclusion in the study. The rationale for including a prebaseline tape was to enhance the likelihood of dependent variable identification skills generalizing to actual passages upon the study's commencement. After listening to a recall passage, the experimenter and secondary observer compared scored information points. Any discrepancy was discussed by reviewing the dependent variable definition and replaying and rescorning the questionable portion of the tape. Accuracy checks continued until at least 95% agreement on the identification of each dependent variable occurred across 2 passages. At this point, the study proper began. The experimenter provided the observer with a copy of the audiotape on predetermined sessions in which an accuracy check was required. The observer determined which sessions were subject to an accuracy check by following a standard procedure.
Since six participants were included in the study, the observer initially pulled two slips of paper from a hat, out of a potential six slips of paper containing numbers 1 through 6, that represented the participants. The two numbers drawn were the participants whose measurement was scheduled for the assessment of interobserver agreement and accuracy checks. At the end of each week, the independent observer asked the experimenter to provide the selected participant's tape chosen for an accuracy check. On the days when a participant was chosen for an assessment of interobserver agreement, procedural integrity assessments were also conducted (see procedural integrity section). During weeks two and four, Tammy and Andy dropped out of the study. They rejoined the study during weeks 6 and 7 at which point interrater agreement and accuracy checks resumed.

Relievability

If a questionable thematic information point was recalled, that information point was discussed with the secondary observers to determine, subjectively, whether the questionable information point makes contextual sense. A questionable thematic information point is defined as information that may share at least one characteristic with the topic, but either does not evoke an affirmative response by the scorer or results in the questioning of such a response. The secondary observers' responses to the question, "Would you relate (thematic information point) to (the topic)?" were used to further identify the contextual
relevance of the questionable recall and determine whether to score the information point as correct or incorrect.

Materials

Data Sheets

An experimenter developed data (answer) sheet was used to record the number of correct and incorrect thematic and text-based information points recalled in a minute.

Scripts

The purpose and procedure of the study was described to the teacher and students based on scripts written by the experimenter and approved by the Human Subjects Review Board (Appendix E).

Selection of Books

Books were selected based on the participants' interests and appropriate grade level as recommended by the participants' teacher. Several different books were brought in for selection by the participants. The participants were also allowed to choose books from the school's library. The experimenter then directly assessed the students' reading. This measure, coupled with the students' indicated preference, determined the book selected.

A 1-minute timing procedure was used to determine the number of correct and incorrect words read in a minute. Grade level is defined as reading greater than 85 words correct per minute with 5 or fewer miscues. When more than one book met these criteria, the participant chose which one
to include in the study based on their interests. Four books, each with a different thematic context, were used in the study. The books chosen by the participants included The cricket in times square (Selden, 1960), Billions of bats (Schlein, 1982), The world of pooh (Milne, 1957), and From sea to shining sea: New jersey (Fradin, 1993).

Tape Recorder

A General Electric (model number: 3-5356A) tape recorder was used to record each session. The tapes were marked 1, 2, and so on to indicate how many tapes were used to record each participant's sessions throughout the study. The participants' first name, and the first and last date of sessions were written on each side of the tape. This served an organizational function by allowing the experimenter and accuracy recorders to find the required session efficiently.

Experimental Design

A multiple baseline across participants experimental design (Cooper, Heron, & Heward, 1987) was intended to be used to determine the effects of instruction and practice on the recall of text-based and thematic information points. Within a multiple baseline across participants design, the relevant dimensional quantities of the dependent variable(s) in the absence of the independent variable(s) are predicted, verified, and replicated by multiple opportunities resulting from the use of several subjects. One of the characteristics of this design is that the introduction of the independent
variable for one participant is contingent on a steady state of responding for a second participant for whom the independent variable has already been introduced. An approximation of a multiple baseline design was evident at the end of the current study since condition changes were contingent on each individual's steady state responding, irrespective of the characteristics of the data path for other participants. Two independent variables were used for the analysis: (a) instruction and listening, and (b) practice and listening. Implementation of each experimental condition change was based upon a visual inspection of charted data and the relation of the data characteristics to an established decision rule.

Instructional frequency aims were established for each participant at 20-25 information points per minute. These are industry established fluency aims and are independent of each participants' prebaseline performance. The participants proceeded to the next experimental phase when they achieved their aim or a steady state of responding defined as a deceleration course of less than X1.2.

During the listening only condition, each participant listened to a passage for 1-minute from a book. After listening to the passage, each participant was asked to recall all the facts and points they could remember in a minute. Immediately after this timing period, each participant was asked to say anything else they knew about the topic (e.g., crickets) in a minute. Hence, there were
two 1-minute assessment periods. Upon a change in the data path for three consecutive sessions, with a celeration of X1.2 or less once this condition was implemented, one to two participants were introduced to the instruction and listening phase. This procedure continued until all participants were introduced to this phase.

During the instruction and listening condition, the experimenter presented additional information on the book topic. The experimenter used the background information sheet he developed to guide his instruction (Appendix F). The background information sheet was identical to the thematic answer sheet used to score recalls. Once a steady state was achieved for at least one participant in the instruction and listening condition, they were introduced to the practice and listening condition. The amount of time devoted to instruction was recorded on the instructional duration data sheet (Appendix G).

During the practice and listening condition, the participants were provided with a copy of the background information sheet used by the experimenter during the instruction and listening condition. The participants were asked to read as many background information points as they could in a minute. These repeated readings of background information points were audiotaped. The number of minutes devoted to practice in each practice session was equivalent to the number of minutes devoted to instruction in the corresponding instructional session. Specifically, the time
devoted to practice during the first practice session was equivalent to the time devoted to instruction during the first instructional session. To ensure an equivalent amount of practice time, the amount of time devoted to instruction during each instructional session was recorded under the total time column on the practice duration data sheet (Appendix H).

In summary, once a steady state of responding was achieved without instruction or practice, the instruction and listening phase was introduced. Once a change in the data path was obtained for three consecutive sessions with instruction only for the first participant, the instruction and listening phase was implemented with an additional one to two participants whose performance was in a steady state. This procedure of systematically introducing phase changes for sets of participants was repeated until all participants experienced all phases of the experiment. Once a participant achieved a steady state in the practice and listening phase, a second book with a different theme was introduced and the design presented above was repeated. Figures 3.1 through 3.3 provide a schematic for the order of the introduction of the instruction and listening, practice and listening, and listening only conditions across participants.
Figure 3.1: Research design schematic for the introduction of the instruction and listening condition across participants.
Figure 3.2: Research design schematic for the introduction of the practice and listening condition across participants.
Figure 3.3: Research design schematic for the introduction of the listening only 2 condition across participants.
Procedures

General Procedures

Each session was initially conducted in a one-to-one format in the morning or afternoon, depending on the participant's schedule. Due to daily time constraints, during the third week of the study, participants were brought down in pairs of two. All passages were read by the experimenter at an oral reading rate of 190-200 words per minute. The experimenter prepared in advance all materials necessary to conduct the study including experimenter made data sheets and setting up the tape recorder before the participant arrived. The experimenter met the student in their classroom and walked them to the experimental setting. In an attempt to maintain a consistent attendance rate among the participants, a treasure box was used. Contingent on a perfect attendance for the week, participants would select one item from the treasure box. Each Friday the participants were allowed to identify a reward to be received the following week. The treasure box consisted of items such as baseball cards, pens, pencils, stickers, and barrettes.

Prebaseline Instruction

Prebaseline instruction was provided to develop good stimulus control over text-based and thematic recalls. Prebaseline instruction included modeling and practice of text-based and thematic information points. The book What happened to the dinosaurs? (Branley, 1989) was used establish good control over text-based and thematic recalls. Before
conducting a practice session, the experimenter explained the definition of a text-based and thematic information point. The experimenter then provided the following instructions:

I am going to play a passage for you and then ask you to tell me as many facts and points as you can remember. Then I will ask you to tell me anything else you want related to the topic of the passage you just heard. But first, I will play a practice passage and show you what I mean.

The experimenter then played a passage for 1-minute. At the completion of the passage, the experimenter prompted the participant to say, "Tell me as many facts and points about the passage you just heard." At this point, the experimenter began recalling text-based information. Immediately following, the experimenter prompted the participant to say, "Tell me anything else about dinosaurs that you know." The experimenter then demonstrated thematic recalls. The same procedure was repeated with a different passage with the experimenter asking the questions and the participant recalling information. All questions were answered about information recalls. The study proper began the next session.

Listening Only

During this condition, the participant listened to a passage read by the experimenter. At the completion of the passage, the experimenter began the audiotape and provided the following directions:
This is (participant's name). Today's date is ____, and she just listened to passage (states passage number) of (states book title) and she is going to recall as many facts and points as she can in a minute. Ready, begin.

At this point the experimenter began the 1-minute timing and the participant began recalling information points. The mean and range of the number of information points per passage per condition across participants are presented in tables 3.2 and 3.3. At the end of the 1-minute timing the experimenter said:

Now, in one minute, tell me anything else about (states book topic) that you know. Ready, begin.

The experimenter then began the 1-minute timing. When time expired, the experimenter said:

Please press stop on the tape recorder. Well done, see you tomorrow.

The experimenter counted the number of correct and incorrect text-based and thematic information points. These data were charted on a standard celeration chart. The criterion to move to the instruction and listening condition was a steady state in the participants' recall of thematic information points.

**Instruction and Listening**

During this condition, the experimenter presented background information related to important events, people, and geographic locations, for instance, in relation to the topic being studied. The instruction consisted of the
<table>
<thead>
<tr>
<th>Participant</th>
<th>L O₁</th>
<th>I &amp; L</th>
<th>P &amp; L₁</th>
<th>L O₂</th>
<th>P &amp; L₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robin</td>
<td>61 (45)</td>
<td>70.7 (15)</td>
<td>69 (24)</td>
<td>57 (12)</td>
<td>49.6 (5)</td>
</tr>
<tr>
<td>Donna</td>
<td>61.4 (45)</td>
<td>67 (17)</td>
<td>72.1 (24)</td>
<td>53.3 (18)</td>
<td>---</td>
</tr>
<tr>
<td>Michelle</td>
<td>54.6 (26)</td>
<td>74 (41)</td>
<td>72.8 (35)</td>
<td>57 (12)</td>
<td>---</td>
</tr>
<tr>
<td>Andy</td>
<td>70.5 (27)</td>
<td>69.6 (27)</td>
<td>74.5 (9)</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Ken</td>
<td>66 (38)</td>
<td>63.4 (23)</td>
<td>85 (21)</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Tammy</td>
<td>67.2 (32)</td>
<td>---</td>
<td>63.8 (32)</td>
<td>---</td>
<td>a</td>
</tr>
</tbody>
</table>

Note: LO₁ = listening only, I&L = instruction and listening, P&L₁ = practice and listening, LO₂ = listening only condition with second book, P&L₂ = practice and listening condition with second book

Table 3.2: Mean and range of text-based information points per passage for orally presented passages. Range reported in ()

a) No data are reported for Tammy in this condition because only one session was run.
<table>
<thead>
<tr>
<th>Participant</th>
<th>$L_{O_1}$</th>
<th>$I &amp; L$</th>
<th>$P &amp; L_1$</th>
<th>$L_{O_2}$</th>
<th>$P &amp; L_2$</th>
</tr>
</thead>
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<td>32.3</td>
<td>32</td>
<td>30.3</td>
</tr>
<tr>
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<td>(13)</td>
<td>(8)</td>
<td>(12)</td>
<td>(15)</td>
<td>(5)</td>
</tr>
<tr>
<td>Donna</td>
<td>37</td>
<td>39.2</td>
<td>33.4</td>
<td>31.1</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>(15)</td>
<td>(8)</td>
<td>(11)</td>
<td>(15)</td>
<td>—</td>
</tr>
<tr>
<td>Michelle</td>
<td>35.6</td>
<td>43.8</td>
<td>39.4</td>
<td>32</td>
<td>—</td>
</tr>
<tr>
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<td>(15)</td>
<td>(21)</td>
<td>(11)</td>
<td>(15)</td>
<td>—</td>
</tr>
<tr>
<td>Andy</td>
<td>38</td>
<td>42.5</td>
<td>37</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
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<tr>
<td>Ken</td>
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<td>34.5</td>
<td>39</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>(17)</td>
<td>(14)</td>
<td>(14)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Tammy</td>
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<td>37</td>
<td>23</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>(17)</td>
<td>—</td>
<td>(13)</td>
<td>(12)</td>
<td>—</td>
</tr>
</tbody>
</table>

Note: $L_{O_1}$ = listening only, $I & L$ = instruction and listening, $P & L_1$ = practice and listening, $L_{O_2}$ = listening only condition with second book, $P & L_2$ = practice and listening condition with second book

Table 3.3: Mean and range of text-based information points per passage for generality probe passages. Range reported in ().
experimenter telling the participant information about the topic in a conversational mode, referring to the information points on the background information sheet as needed. The information points served to guide the direction of the experimenters informational presentation and occurred from between 1-4 minutes. Each instructional session was timed and the total time was recorded on the instructional duration data sheet. At the completion of the thematic instruction, the experimenter recorded the time and read the passage for that day. The instructions were identical to those described in the listening only condition with the exception of providing instruction prior to listening to the passage. The criterion to move to the practice and listening condition was a steady state in the participants' recall of thematic information points.

**Practice and Listening**

During this condition, the student was given the background information sheet. The student was provided an opportunity to review the information on the sheet and the pronunciation of any difficult words were modeled. The student was allowed to practice until the participant could correctly pronounce the word. Practice did not exceed 4 attempts. Before the formal practice session began, the experimenter recorded the amount of time, in whole minutes, devoted to instruction in the corresponding instructional session in the first row of the practice duration data sheet under the "total time" column. That amount of time was then devoted to practice. Therefore,
the number of whole minutes devoted to instruction in the first instructional session was equivalent to the amount of time in whole minutes devoted to practice in the first practice session. The number of times the list was read was also recorded on the practice duration data sheet. Any remainder time in seconds less than 50 seconds was not counted as part of the total amount of practice time. The amount of practice time, then, was equivalent to or less than the amount of time devoted to instruction. Directions for this phase of the study were as follows:

The sheet in front of you has the same information listed that I have been discussing with you for the past couple days. What I would like you to do is read as many of these as you can in a minute.

At this point the experimenter started the tape recorder and said:

This is (states participant name) and today's date is _____. (Participant's name) is going to read as many background information points as he can in a minute. If you finish the list before time expires, continue reading from the top. Ready, begin.

After the first 1-minute timing expired, the procedure was repeated as many times as necessary to fulfill the number of minutes specified on the practice duration data sheet. All subsequent directions followed those described in the instruction and listening condition.
Procedural Integrity

To assess the consistent application of the procedure, a task analysis of the procedure was conducted and a checklist was developed (Appendix I). For sessions other than when a second observer was present, a procedural integrity checklist was present. The experimenter checked off each step of the procedure once it was completed. This provided data on the consistent application of each step of the procedure. Furthermore, since each session was recorded, two additional observers listened to the first three sessions of the study to ensure the consistent application (i.e., 100% of the steps of the procedure completed correctly) of the independent variables. Additional sessions were randomly selected throughout the course of the study for procedural integrity checks.

An independent observer randomly selected at least 26.8% of the passages for an integrity check. At least 19.3% of passages were assessed weekly. The observer pulled three to four out of a potential six slips of paper containing numbers 1 through 6, which represent the days of the week (e.g., 1 represents Monday, 2 represents Tuesday), from a hat. The two numbers drawn were the days scheduled for procedure checks with the numbers 5 and 6 representing Friday. When asked by the independent observer, the experimenter provided a tape of a selected session to check for procedural integrity. If discrepancies arose between the checklist and the observed procedures, the observer reported the
discrepancies to the experimenter and the procedures were reviewed. Procedural integrity is reported as the number of correct and incorrect adherences to each of the items on the procedural checklist.

Generality

See/say reading

To assess for generality across learning channels and passages, students read from a text for 1-minute, then recalled as many text-based information points as they could in a minute. Before the formal 1-minute timing, two 1-minute repeated reading timings were conducted as a "warm-up" activity. Warm-up activities are a common strategy among precision teachers to help promote fluent repertoires and eliminate fluency blockers, of which, unfamiliar words are an example. On a priori selected days, the experimenter provided the following instructions:

When I say begin, read as much as you can in a minute from this passage beginning here (experimenter points to a word). Ready, begin.

During the 1-minute timing, if the participant was unable to pronounce a word, the experimenter modeled the correct pronunciation and the participant repeated the word and continued reading. The prompts for text-based and thematic information points were identical to those previously described. Generality across learning channels was assessed at least three times prior to the instruction and listening condition and at least three times prior to each condition.
change, two of which immediately precede a condition change. The passages for this assessment were different from the experimenter read the passages.

**Maintenance**

Maintenance probes were conducted during or shortly after completing the instruction and listening or practice and listening phase. Whenever there were at least four consecutive days in which a session was not conducted, a maintenance probe occurred. The maintenance probe consisted of the experimenter asking the participant, "What do you remember about (states topic)."

**Consumer Satisfaction**

A questionnaire was provided to the participant's and the participant's teacher following the last day of instruction (Appendix J). Both open ended questions and Likert-type ratings were used. The items focused on the usefulness and effectiveness of the instruction. The results of the questionnaire are compiled and reported by the investigator.
CHAPTER 4
RESULTS

This chapter presents the results of this research investigation. The chapter begins with a summary of the procedures employed to ensure the believability and integrity of the data and the procedures. Additionally, percentage of accuracy agreement and adherence to procedural integrity checklists to ensure adherence to the protocol across phases and weeks are presented. The experimental results and measures of social validity are presented last.

Procedural Integrity

To help judge the integrity of applying the listening only, instruction and listening, and practice and listening conditions, procedural integrity checklists were developed.

Table 4.1 reports the percentage and frequency of passages across phases and participants that procedural integrity checks were conducted. Percentage of passages per phase was computed by dividing the total number of passages read by the number of passages that procedural integrity checks were conducted multiplied by 100. Between 50 and 100 percent of the passages per phase were subjected to integrity checks.
<table>
<thead>
<tr>
<th>Participant</th>
<th>L O₁</th>
<th>I &amp; L</th>
<th>P &amp; L₁</th>
<th>L O₂</th>
<th>P &amp; L₂</th>
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<td></td>
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<td>(8/9)</td>
<td>(6/9)</td>
<td>(4/6)</td>
<td>(4/6)</td>
</tr>
<tr>
<td>Donna</td>
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<td>100</td>
<td>83</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(16/17)</td>
<td>(11/11)</td>
<td>(10/12)</td>
<td>(12/12)</td>
<td></td>
</tr>
<tr>
<td>Michelle</td>
<td>88</td>
<td>83</td>
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<td>80</td>
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Note: LO₁ = listening only, I&L = instruction and listening, P&L₁ = practice and listening, LO₂ = listening only condition with second book, P&L₂ = practice and listening condition with second book

Table 4.1: Percent and number of passages per phase across participants that procedural integrity was conducted. Number of passages per phase are listed in () where (19/22) means 19 passages out of 22 were checked.
Percentage of adherence to procedural steps was calculated by dividing the number of correctly executed steps per session by the total number of steps, multiplied by 100. Across all phases and participant's, with the exception of Tammy's practice and listening phase, adherence to procedural steps was 100%. Procedural steps were followed 99.4% of the time during Tammy's practice and listening phase.

**Accuracy**

Table 4.2 reports the number and percentage of passages across weeks and phases, and cumulative percentage of passages in which interobserver agreement checks were conducted. Percentage of passages was calculated by dividing the number of passages in which interobserver agreement checks were conducted by the total number of passages read per week or phase, multiplied by 100. Percentage of passages subjected to interobserver agreement checks per week spread from 21.7 in week 7 to 33.3 in weeks 5 and 9 respectively. Percentage of passages per condition subjected to interobserver agreement checks ranged from 24 in the listening only phase to 31.2 in the instruction and listening phase. Interobserver agreement checks were conducted on 26.8 percent of all passages used in this study.

Table 4.3 reports number and percentage of accuracy agreement, calculated using a point-by-point occurrence calculation method (Kazdin, 1982). Percentages were
<table>
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Note: LO = listening only, I&L = instruction and listening, P&L = practice and listening

Table 4.2: Weekly and cumulative percentage of passages in which interobserver agreement checks were conducted across weeks and phases.
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Note: LO₁ = listening only, I&L = instruction and listening, P&L = practice and listening, LO₂ = listening only condition with second book

Table 4.3: Percentage and number of accurately scored passages based on a point-by-point occurrence of correct and incorrect thematic and text-based recalls across phases. Number of passages per phase are listed in () where (94/96) means 94 out of 96 passages were scored correctly compared with the true value.
derived by dividing the total number of information points per phase across correct and incorrect dependent variables that were scored by both the experimenter and secondary observer (agreements), by the total number of agreements plus disagreements, multiplied by 100. A nonoccurrence agreement calculation method was used for instances in which no response occurred within the phase. In cases where disagreements occurred, that day's recalls were replayed and rescored to match the true value.

Agreements for correct thematic information points spread from 97.9 to 100 percent of the information points scored. Agreements for incorrect thematic information points was 100 percent across phases. During the listening only1, practice and listening, and listening only2 phases, agreement was, by default, 100% since no incorrect recalls occurred.

Agreements for correct text-based information points ranged from 96.6 to 100 percent of the information points scored. Agreements for incorrect text-based information points ranged from 87.5 to 100 percent across phases.

Experimental Results

Thematic Recalls

With the exception of Tammy, Figures 4.1 through 4.6 shows each child's performance during listening only, instruction and listening, and practice and listening conditions. Since Tammy experienced only two conditions,
listening only and practice and listening, data for instruction and listening are not shown. Each data point represents thematic recalls performed during 1-minute assessments. Under each condition, orally presented recalls are described first, followed by generality probe recalls, then incorrects. Orally presented recalls refer to hear-say learning channel sets while generality probe recalls refer to see-say learning channel sets. The descriptive statistics for each participant across all relevant phases and learning channel sets for thematic recalls and celeration values across participants and conditions are presented in Tables 4.4 through 4.7.

Robin

Listening Only. Robin's thematic recalls remained stable with a celeration of X 1.0 across 11 sessions of listening only. Robin recalled 4 to 10 information points per minute, averaging 3.1 information points. Incorrect recalls remained at 0 throughout the phase.

Robin's generality probe recalls remained relatively stable. Robin's recalls jumped up on the final day of the condition from 3 to 5 correct recalls per minute. Robin's mean frequency of correct information points recalled was 3.7 with a spread of 3 to 5 information points per minute. Incorrect recalls remained at 0 throughout the condition.

Instruction and Listening. Robin experienced a frequency jump-up in her correct thematic recalls on the first day of the instruction and listening condition.
Figure 4.1: Robin's Thematic Recall Chart
Robin’s correct recalls jumped from 2 to 6, a three-fold increase. On the second day, Robin’s recalls continued to improve, recalling 10 thematic information points. Hence, the first two data points represent a performance change of X 5. A celeration turn down with a celeration value of +3.5 occurred on the subsequent two days. A second frequency jump-up in Robin’s recalls occurred on the fifth day of this phase and remained stable for the subsequent three sessions with a X 1.0 celeration. Robin’s mean frequency of correct generality probe information points recalled was 9 with a spread of 6 to 14 information points per minute. Incorrect recalls remained at 0 throughout the phase.

Robin’s correct generality probe recalls remained relatively stable. Robin’s mean frequency of correct generality probe information points recalled was 11.3 with a spread of 10 to 13 information points per minute.

**Practice and Listening 1.** A correct frequency jump-down occurred on the first day of the practice and listening phase. Robin’s data were variable for the subsequent two sessions of this phase indicated by an initial frequency jump-up followed by a frequency jump-down in thematic recalls. The value of the deceleration in correct recalls is +3.0. Robin’s data stabilized with a celeration value of X 1.0 with a second jump-up no-turn during the subsequent three sessions. Robin’s mean frequency of correct recalls was 9.6 per minute with a
spread of 7 to 12 information points per minute. Incorrect recalls remained at 0 throughout the phase.

Robin's generality probe recalls remained stable for the first two days of generality probe data collection, while experiencing a jump-up on the final day. Robin's mean frequency of correct generality probe information points recalled was 11.6 with a spread of 10 to 15 information points per minute.

**Listening Only 2.** Robin's frequency of correct thematic recalls jumped-down by slightly more than half upon the introduction of the second book. Robin's frequency of correct thematic recalls jumped-down from 10 to 4 correct recalls per minute. Robin's overall celeration value for this phase was X 1.5. Robin's mean frequency of correct recalls was 4.6 per minute with a spread of 3 to 8 information points per minute. Incorrect recalls remained at 0 throughout the phase.

Upon the introduction of the second book, Robin's generality probe recalls remained stable. Robin's frequency of correct generality probe recalls jumped-down by 1 correct recall per minute on the final day of this condition. Robin's mean frequency of correct generality probe information points recalled was 4.6 with a spread of 4 to 5 information points per minute.

**Practice and Listening 2.** Robin's frequency of correct thematic recalls jumped-down on the first session of this condition. Robin's correct recalls jumped-up on
the very next session and remained stable for the next and, ultimately, final session of the study. Robin's mean frequency of correct recalls was 7 per minute with a spread of 5 to 8 information points per minute. With the exception of the first day of this phase, in which Robin said "twinkle" when asked to say as much as she knew about bats, Robin's incorrect recalls remained at zero.

Robin's frequency of correct generality probe recalls remained relatively stable upon the introduction of the second book. On the final two days of this phase, Robin's frequency of correct generality probe recalls jumped-up and turned-down with a deceleration value of ± 1.3. Robin's mean rate of correct generality probe information points recalled was 7 with a spread of 5 to 9 information points per minute.

Maintenance Probe. The experimenter conducted a maintenance probe for thematic recalls of the first book on the final day of data collection. Robin recalled 8 correct thematic information points which falls within the spread of her thematic recalls in the practice and listening phase.

Donna

Listening Only 1. Donna's initial four sessions in this phase produced a celeration in the number of correct thematic information points recalled. The celeration value was X 3.0. A subsequent deceleration across 5 sessions of ± 2.0 occurred followed by a frequency jump-up. Donna's
Figure 4.2: Donna's thematic recall chart
mean frequency of correct information points recalled was 6.8 per minute with a spread of 4 to 10 recalls per minute. Incorrect recalls remained at 0 throughout the phase.

Donna's generality probe recalls exhibited some bounce across the first five days of this phase. Donna's slope of correct generality probe recalls was +1.8. On the final three days that these data were collected, a frequency jump-up and slight celeration turn-up occurred with a slope of X 1.15. Donna's mean frequency of correct generality probe information points recalled was 6.4 with a spread of 3 to 9 information points per minute.

Instruction and Listening. Donna experienced a frequency jump-down in her correct thematic recalls upon the initial implementation of this condition. Donna recalled 6 to 12 information points per minute during the first three days of this condition. The data stabilized during the subsequent three sessions with a spread of 12 to 13 information points per minute. Donna's mean frequency of correct recalls was 10.3 per minute with a spread of 6 to 13 information points per minute. Donna's incorrect recalls remained at zero with the exception of the second and fourth days of this condition, in which Donna said "burp" when asked to say as much as she knew about crickets.

Donna's generality probe recalls remained stable upon the introduction of this condition. The frequency of correct recalls jumped-up on the second day remaining
stable for the duration of the phase with a slope of \( X \ 1.0 \). Donna's mean frequency of correct generality probe information points recalled was 11.2 with a spread of 6 to 15 information points per minute.

**Practice and Listening 1.** A frequency jump-down and celeration turn-up occurred upon implementing the practice and listening phase. Donna's correct thematic recalls almost halved on the first day of this phase, dropping from 12 to 7 per minute. The celeration value of the subsequent turn-up was \( X \ 2.3 \). During the final two sessions, Donna's frequency of corrects jumped-down and turned-up with a celeration of \( X \ 4.5 \). Donna's mean recalls were 14.8 per minute with a spread of 7 to 20 information points per minute. Incorrect recalls remained at 0 throughout the phase.

Donna's generality probe recalls turned-down with a slope of \( \pm \ 3 \) across the first two days these data were collected. Donna's correct recalls jumped-up on the third day of generality probe data collection and remained stable for the rest of the phase with a slope of \( X \ 1.0 \). Donna's mean frequency of correct generality probe information points recalled was 17.6 with a spread of 12 to 20 information points per minute.

**Listening Only 2.** Donna's frequency of correct thematic recalls again jumped-down and turned-up upon the introduction of the second book. Donna's frequency of correct thematic recalls jumped-down from 15 to 1 recall
per minute. Donna's celeration turn-up value for the first five sessions of this phase was X 8.0. The celeration value of Donna's final three data points was X 1.8. Donna's mean frequency of correct recalls was 4.8 per minute with a spread of 1 to 8 information points per minute. Incorrect recalls remained at 0 throughout the phase.

Donna's frequency of correct generality probe recalls jumped-down and turned-down during the first two days of this condition. Donna's celeration of correct recalls turned-up on the third session at a celeration of X 3.5 and continued for the remainder of the condition. Donna's mean frequency of correct generality probe information points recalled was 6.8 with a spread of 3 to 11 information points per minute.

**Maintenance Probes.** A maintenance probe was conducted on the fifth day of the instruction and listening condition. Donna recalled 8 thematic information points. A second probe was conducted on the final day of the study, 13 days after the final practice and listening session. Donna recalled 12 correct thematic information points which falls within the range of her thematic recalls in the practice and listening phase.

**Michelle**

**Listening Only**. During 5 sessions of listening only, Michelle's thematic recalls varied between 1 and 4 recalls per minute. Michelle's mean frequency of correct
Figure 4.3: Michelle's correct thematic recalls
information points recalled was 3 per minute. Incorrect recalls remained at 0 throughout the phase.

Michelle's generality probe recalls jumped-down and turned-up on the second and third sessions that these data were collected. The slope of the turn-up was X 3. Michelle's mean frequency of correct generality probe information points recalled was 2.6 with a spread of 2 to 3 information points per minute.

Instruction and Listening. Michelle experienced a frequency jump-up in her thematic recalls upon the initial implementation of this condition. Michelle recalled between 5 and 8 correct information points per minute during the first six days of this condition. On the eighth session of this phase, Michelle's correct recalls turned up at a celeration of X 1.5. Michelle recalled 8 thematic information points on the final day of this phase. Michelle's mean frequency of correct recalls was 7.7 per minute with a spread of 5 to 12 information points per minute. Incorrect recalls remained stable, fluctuating from 0 to 1 incorrect thematic recall.

Compared with the end of the previous phase, Michelle's frequency of correct generality probe recalls jumped-up and her celeration turned-up on the first and second sessions that these data were collected. Michelle's correct generality probe recalls virtually tracked her hear-say recalls. The slope of the turn-up was X 1.4. A frequency jump-down occurred on the final day of this
phase. Michelle's mean frequency of correct generality probe information points recalled was 8.6 with a spread of 6 to 14 information points per minute.

**Practice and Listening 1.** A frequency jump-up, celeration turn-up occurred upon implementing the practice and listening phase. Michelle's correct thematic recalls doubled on the first day of this phase, increasing from 7 to 14 per minute. The celeration value of the subsequent turn-up was X 1.9. Michelle's data remained stable at X 1.0 during the final three sessions. Michelle's mean frequency of correct recalls was 26.6 per minute with a spread of 14 to 34 information points per minute. Incorrect recalls remained at 0 throughout the phase.

Michelle's frequency of correct generality probe recalls jumped-up twice during the first four days these data were collected. Michelle's correct recalls remained stable with a celeration of X 1.0. Michelle's mean frequency of correct generality probe information points recalled was 29.2 with a spread of 23 to 34 information points per minute.

**Listening Only 2.** Michelle's frequency of correct thematic recalls jumped-down and turned-up upon the introduction of the second book. Michelle's frequency of correct thematic recalls jumped-down from 32 to 1 recall per minute. Michelle's celeration turn-up value for the first two sessions of this phase was X 8.0. The overall celeration value of this phase was X 3.0. Michelle's mean
frequency of correct recalls was 2.3 per minute with a spread of 1 to 4 information points per minute. Incorrect recalls remained at 0 throughout the phase.

Michelle's frequency of correct generality probe recalls jumped-down on the first day and turned-up on the second session. The slope of the turn-up was X 8. Correct recalls jumped-down on the final day of the phase. Michelle's mean frequency of correct generality probe information points recalled was 2.5 with a spread of 0 to 4 information points per minute.

Maintenance Probe. On the final day of the study, 8 days after the final practice and listening session, Michelle recalled 30 thematic information points, falling within the upper range of her thematic recalls in the practice and listening phase.

Andy

Listening Only. Andy's thematic recalls were extremely stable across 5 sessions of listening only. With the exception of one outlier, Andy recalled 0 thematic information points. Andy recalled two correct thematic information points during the second session of the study. Andy's mean frequency of correct information points recalled was 0.4 per minute with a spread of 0 to 2 per minute. Incorrect recalls remained at 0 throughout the phase.
Figure 4.4: Andy's correct thematic recalls chart
Andy's correct generality probe recalls remained stable throughout this phase. Andy did not recall one correct or incorrect generality probe information point. 

**Instruction and Listening.** Andy experienced a frequency jump-up in correct thematic recalls upon the initial introduction of this condition. Andy recalled 4 to 8 correct information points per minute during the first three days of this condition. A celeration turn-up occurred on the fourth session of this condition. A celeration of $X \ 2.6$ continued for the following six sessions. At this point Andy dropped out of the study for 3 weeks. Upon resuming participation in the study, Andy recalled an additional thematic information point compared with his last recall attempt three weeks prior. Andy's celeration continued at $X\ 1.4$. Andy's mean frequency of correct thematic recalls across 13 sessions was 15.5 per minute with a spread of 4 to 30 information points per minute. Incorrects remained stable, ranging between 0 and 1 throughout the condition.

Andy's frequency of correct generality probe recalls jumped-up and turned-up on the first and second sessions that these data were collected. After a three week lapse in data collection, Andy's frequency of correct generality probe recalls jumped-up and turned-up at a celeration of $X\ 1.4$. Andy's mean frequency of correct generality probe information points recalled was 21 with a spread of 11 to 27 information points per minute.
Practice and Listening. There was a slight frequency jump-down upon the introduction of this phase. Andy recalled 26 information points on the first day of this condition, while recalling 30 information points on the final session of the previous condition. Andy recalled 27 information points on the final day of the study. Andy's mean frequency of correct recalls was 26.5 per minute with a range of 1 recall. Incorrect recalls remained at 0 throughout the condition.

Andy's correct generality probe recalls remained stable with no jumps or turns for the two days in which data were collected. Andy's mean frequency of correct generality probe information points recalled was 28.5 with a spread of 28 to 29 information points per minute.

Maintenance Probes. The experimenter asked Andy how much he remembered about the topic on the first day of Andy's return to the study. He remarked, "I remember a lot." Andy recalled 17 thematic information points, he recalled 19 three weeks earlier.

Ken

Listening Only. Ken's celeration of correct recalls was X 1.6 during the first four sessions of this condition. Ken's recalls turned-down over the next three sessions with a value of X 4.0. Beginning with session 9, Ken's frequency of correct recalls jumped-up with a celeration turn-up of X 2.0. Ken's data remained stable for three out of the final four sessions of this condition with a
Figure 4.5: Ken's correct thematic recalls chart
celeration value of X 1.2. A jump-down occurred on the final day of this condition with Ken recalling 3 correct information points. Ken's mean frequency of correct recalls across 16 sessions was 4.6 per minute with a spread of 0 to 11. Incorrect recalls remained at 0 throughout the phase.

Ken's correct generality probe recalls were variable for the first six sessions that these data were collected with a deceleration of ± 2.0. On the seventh session of generality probe data collection, Ken's frequency of correct recalls jumped-up, with a celeration turn-up of X 1.3. The final two session of generality probe data collection turned down at ± 2.6. Ken's mean frequency of correct generality probe information points recalled was 4.7 with a spread of 7 to 15 information points per minute.

Instruction and Listening. Ken experienced a jump-up in correct thematic recalls upon the introduction of this condition, recalling 7 correct information points. Ken's recalls more than doubled by the fourth session, recalling 17 thematic information points. The celeration value was X 2.3 for the first four sessions of this condition. A X 1.0 celeration occurred during the final three days of this condition. Ken's mean frequency of correct recalls was 19.8 with a spread of 7 to 27 information points per minute. Incorrect recalls remained at 0 throughout the phase.
Ken's correct recalls jumped-up on the first day of generality probe data collection. Correct recalls turned-up across the next three session at X 1.5. On the fifth session of generality probe data collection, Ken's recalls jumped-down with no-turn for the final two sessions of this condition. Ken's mean frequency of correct generality probe information points recalled was 25.5 with a spread of 11 to 26 information points per minute.

Practice and Listening. Ken recalled 29 information points on the first day of this condition, two more than the final session of the previous condition. Ken's thematic recalls continued to improve recalling 32 and 35 information points respectively during his final two sessions. Ken's mean frequency of correct recalls was 32 per minute with a spread of 29 to 35 information points per minute. Incorrect recalls remained at 0 throughout the phase.

Ken's frequency of correct recalls remained stable with no-jump or celeration turn across the three days generality probe data were collection. The celeration value for generality probe recalls was X 1.15. Ken's mean frequency of correct generality probe information points recalled was 32 with a spread of 31 to 33 information points per minute.
Maintenance Probe. A maintenance probe was conducted on the final day of the study prior to practicing the background information points. Ken recalled 27 information points.

Tammy

Listening Only. Tammy's celeration of thematic recalls across the initial 4 sessions of this condition was $+1.8$. Tammy's frequency of correct recalls jumped-up slightly on the fifth session of this phase. This was also her last day as she dropped out of the study for four weeks. Upon returning, Tammy recalled 10 correct information points. Tammy's mean frequency of correct recalls was 9.8 per minute with a spread of 7 to 12 per minute across 5 sessions. Incorrect recalls remained at 0 throughout the phase.

A celeration in correct generality probe recalls occurred across the two sessions that these data were collected at a $X 1.1$. Tammy's mean frequency of correct generality probe information points recalled was 8 with a spread of 7 to 9 information points per minute.

Practice and Listening 1. Given Tammy's clear frustration with her perceived inability to tell the experimenter anything about the subject matter, the practice and listening condition was implemented. There was an immediate frequency jump-up, celeration no-turn in the number of thematic information points recalled. There was a turn-up in the data beginning the fifth session with
Figure 4.6: Tammy's correct thematic recalls chart
a celeration value of X 1.5. Tammy's mean frequency of correct recalls was 25 per minute with a spread of 15 to 40 correct information points per minute. Incorrect recalls remained at 0 throughout the phase.

On the first session of generality probe data collection, Tammy's correct recalls remained relatively stable compared to the last session of the previous condition, recalling only one additional correct information point. Tammy's correct recalls jumped-up and turned-up for the remaining duration of the condition at a X 1.6. Tammy's mean frequency of correct generality probe information points recalled was 24.1 with a spread of 10 to 37 information points per minute.

Listening Only 2. Tammy's thematic recalls jumped-down upon the introduction of the second book. Tammy recalled 4 correct thematic information points during her second and only session of this condition that the passage was presented orally. Incorrect recalls remained at 0.

On the first day of this condition, Tammy's frequency of correct generality probe recalls jumped-down by 33 information points. Tammy's frequency of correct recalls jumped-down a second time by slightly more than half, recalling two correct information points.

Maintenance Probe. A maintenance probe was conducted on the final day of the study. Tammy recalled 29 information points.
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Note: LO₁= listening only, I&L= instruction and listening, P&L₁= practice and listening, LO₂= listening only condition with second book, P&L₂= practice and listening condition with second book.

Table 4.4: Mean and range of correct thematic information points recalled from orally presented (hear-say channel) text per phase. Range reported in ().
<table>
<thead>
<tr>
<th>Participant</th>
<th>L O₁</th>
<th>I &amp; L</th>
<th>P &amp; L₁</th>
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Note: L O₁ = listening only, I&L = instruction and listening, P&L₁ = practice and listening, L O₂ = listening only condition with second book, P&L₂ = practice and listening condition with second book.

Table 4.5: Mean and range of correct thematic information points recalled from generality probe (see-say channel) text per phase. Range reported in ( ).

98
Table 4.6: Thematic celeration values across conditions and participants for orally presented passages. Celeration values represent overall celeration for each condition. Celeration is defined as the angle of the slope whose value indicates how much behavior is multiplying or dividing per week.

<table>
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<tr>
<th>Participant</th>
<th>LO₁</th>
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<td>Ken</td>
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<td>X 1.0</td>
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<tr>
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Note: LO₁ = listening only, I&L= instruction and listening, P&L₁= practice and listening, LO₂= listening only condition with second book, P&L₂= practice and listening condition with second book

ᵃ) Only data for the first 4 sessions of this condition were used in the calculation of the slope value.
<table>
<thead>
<tr>
<th>Participant</th>
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<th>L O₂</th>
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<tr>
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<td>X 2.35</td>
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Note: L O₁ = listening only, I&L = instruction and listening, P&L₁ = practice and listening, L O₂ = listening only condition with second book, P&L₂ = practice and listening condition with second book.

Table 4.7: Thematic celeration values across conditions and participants for generality probe passages. Celeration values represent overall celeration for each condition. Celeration is defined as the angle of the slope whose value indicates how much behavior is multiplying or dividing per week.
Text-Based Recalls

With the exception of Tammy, Figures 4.7 through 4.12 shows each child's performance during listening only, instruction and listening, and practice and listening conditions. Since Tammy experienced only two conditions, listening only and practice and listening, data for instruction and listening are not shown. Under each condition, orally presented recalls are described first, followed by generality probe recalls, then incorrects. Orally presented recalls refer to a hear-say learning channel set while generality probe recalls refer to a see-say learning channel set. Each data point represents text-based recalls performed during a 1-minute assessment. The descriptive statistics for each participant across all relevant phases and learning channel sets for text-based recalls and celeration values across participants and conditions are presented in Tables 4.8 through 4.11.

Robin

Listening Only 1. Robin's text-based recalls remained relatively stable, with an overall celeration of X 1.2, across 11 sessions of listening only. Robin's mean frequency of correct information points recalled was 7.3. With the exception of an outlier of 2 information points recalled, the spread was 5 to 11 information points recalled per minute. Robin's mean frequency of incorrect
Figure 4.7: Robin's correct text-based recalls chart
information points recalled was .44 with a spread of 0 to 2 per minute.

Robin's correct generality probe recalls remained stable for the first two days these data were collected. Robin's correct recalls then jumped-down and turned-down at a \( \Delta = 1.3 \) across the next two sessions. Correct recalls then jumped-up with no-turn for the remainder of the condition with a celeration of \( X = 1.0 \). Robin's mean frequency of correct generality probe information points recalled was 9 with a spread of 5 to 11 information points per minute.

**Instruction and Listening.** Robin experienced a jump-down turn-down for the first three days of this condition. Robin's correct recalls jumped-down from 11 to 9 per minute. The turn-down celeration value was \( \Delta = 100 \). Robin's recalls jumped-up on the fourth day, recalling 6 correct text-based information points. A second jump-down turn-up occurred during the remaining three days of the condition. The turn-up celeration value was \( X = 30 \). Robin's mean frequency of correct recalls was 6.4 with a spread of 3 to 10 information points per minute. Robin's mean frequency of incorrect information points recalled was .5 with a spread of 0 to 2 per minute.

Robin's frequency of correct generality probe recalls remained relatively stable for the first day these data were collected in relation to the final 5 sessions of the previous condition. A jump-down occurred on the second day of generality probe data collection, with a jump-up to the
previous level on the final day of the condition. Robin's mean frequency of correct generality probe information points recalled was 10 with a spread of 6 to 12 information points per minute.

**Practice and Listening 1.** A jump-down occurred on the first day of the practice and listening phase followed by a celeration turn-up. Robin's text-based recalls jumped-down from 11 to 8 correct recalls per minute. With the exception of one outlier, the turn-up celeration slope was X 1.8. Robin's correct recalls averaged 7.5 with a spread of 3 to 11 information points per minute. Robin's mean frequency of incorrect information points recalled was .88 ranging from 0 to 3 per minute.

Robin's frequency of correct generality probe recalls jumped-up with a celeration turn-down across the three days these data were collected. The value of the celeration turn-down was ± 2.6. Robin's mean frequency of correct generality probe information points recalled was 13 with a spread of 9 to 15 information points per minute.

**Listening Only 2.** Upon the introduction of the second book, Robin's frequency of correct text-based recalls jumped-up with a slight celeration turn-down of ± 1.2. Robin's correct recalls averaged 10.3 with a spread of 9 to 12 information points per minute. Robin's mean frequency of incorrect information points recalled was .5 ranging from 0 to 2 per minute.
Robin's correct generality probe recalls jumped-down on the first day of this phase. A frequency jump-up and a second frequency jump-down occurred on the second and third day respectively of generality probe data collection. Robin's mean frequency of correct generality probe information points recalled was 7.3 with a spread of 4 to 12 information points per minute.

**Practice and Listening 2.** On the first session of this phase, Robin's text-based recalls jumped-down. Robin's frequency of correct recalls jumped-up on the second day of the condition with a slight celeration turn-down in the data for the duration of the condition. Robin's correct recalls averaged 9.7 with a spread of 6 to 12 information points per minute. Robin's mean frequency of incorrect information points recalled was .33 with a spread of 0 to 1 per minute.

Robin's correct generality probe recalls jumped-up slightly compared with the final session of the previous phase, then turned-down for the remainder of the phase. The deceleration of the turn-down was ± 1.6. Robin's mean frequency of correct generality probe information points recalled was 10 with a spread of 8 to 13 information points per minute.

**Donna**

**Listening Only 1.** Donna's text-based recalls were, with the exception of two outliers, stable across 10 sessions of listening only, with a celeration value of X
Figure 4.8: Donna's correct text-based recalls chart
1.0. Donna recalled 1 and 3 text-based information points on days two and eight, respectively. All other recalls spread from 5 to 8 recalls per minute. The mean frequency of correct information points recalled per minute was 6 with a spread of 1 to 8. Donna's mean frequency of incorrect information points recalled was .41 with a spread of 0 to 3 per minute.

Donna's correct generality probe recalls jumped-up and turned-down three times across six sessions of data collection. Donna's mean frequency of correct generality probe information points recalled was 7 with a spread of 2 to 11 information points per minute.

Instruction and Listening. Donna's correct text-based recalls remained stable upon the introduction of this phase. Donna recalled between 5 and 8 information points per minute up until the final day of this phase when she recalled 2 information points. Donna's correct recalls averaged 5.3 with a spread of 2 to 7 information points per minute. Donna's mean frequency of incorrect information points recalled was .36 with a spread of 0 to 3 per minute.

Donna's correct generality probe recalls jumped-up and turned-down across the first four days these data were collected. The deceleration of the turn-down was −4. Donna's correct recalls jumped-up on the final day of the phase. Donna's mean frequency of correct generality probe information points recalled was 6.8 with a spread of 2 to 9 information points per minute.
Practice and Listening 1. Donna recalled 0 information points upon the introduction of this condition. Donna’s recalls jumped-up twice, once on the second session of the condition and again on the fourth session. Each jump-up remained stable for two sessions. A turn-down with a celeration value of 0.9 occurred following the second jump-up which lasted for the final three days of the condition. Donna’s correct recalls averaged 7.4 ranging, with the exception of the first day of this condition in which she recalled zero correct, from 5 to 13 correct recalls per minute. Donna’s mean frequency of incorrect information points recalled was .75 ranging from 0 to 3 per minute.

Donna’s correct generality probe recalls jumped-up on the first session these data were collected. Across the next four days, with the exception of one outlier where Donna recalled 6 correct information point, Donna’s recalls turned-up at a celeration of 3. Donna’s mean frequency of correct generality probe information points recalled was 15.2 with a spread of 6 to 27 information points per minute.

Listening Only 2. Upon the introduction of the second book, Donna’s text-based recalls jumped-up, recalling 5 additional text-based information points than the final session of the previous condition. Donna again experienced two jumps in her recalls, with slight decelerations across two consecutive days. On the final day of the study,
Donna's recalls jumped-down from 7 to 1 recall. Donna's correct recalls averaged 5.3 with a spread of 1 to 9 information points per minute. This spread does not include the final day of the study in which Donna recalled 1 correct information point. Donna's mean frequency of incorrect information points recalled was .58 ranging from 0 to 2 per minute.

Donna's correct generality probe recalls jumped-down and turned-up across the first four days in which these data were collected. Donna's turn-up celeration was X 1.6. Correct recalls jumped-down with no-turn during the final two day of data collection. Donna's mean frequency of correct generality probe information points recalled was 7.8 with a spread of 6 to 11 information points per minute.

Michelle

Listening Only 1. During 5 sessions of listening only, Michelle's text-based recalls varied between 1 and 3 recalls per minute. Michelle's mean frequency of correct recalls was 1.4 with a spread of 1 to 3 information points per minute. Michelle's mean frequency of incorrect information points recalled was .38 ranging from 0 to 1 per minute.

Michelle's correct generality probe recalls remained relatively stable across three sessions of data collection with a deceleration of x 1.2. Michelle's mean frequency of correct generality probe information points recalled was 9.3 with a spread of 8 to 11 information points per minute.
Instruction and Listening. Upon the initial implementation of this condition, Michelle experienced a frequency jump-up in her text-based recalls. The very next session recalls jumped-down and remained stable for three days with a celeration value of X 1.0. Michelle's recalls then jumped-up and turned-down across the next three sessions with a celeration value of \( \pm 3.5 \). Recalls then jumped-up and remained relatively stable for the remainder of the condition with a celeration value of \( \pm 1.2 \). Michelle's correct recalls averaged 4.7 with a spread of 2 to 8 information points per minute. Michelle's mean frequency of incorrect information points recalled was .45 ranging from 0 to 2 per minute.

Michelle's correct generality probe recalls jumped-up and turned-up across the first 6 session that these data were collected. The slope of the celeration was X 2. Michelle's correct recalls then turned-down for the remainder of the condition with a slope of \( \pm 2.6 \). Michelle's mean frequency of correct generality probe information points recalled was 11.4 with a spread of 6 to 21 information points per minute.

Practice and Listening 1. Recalls remained stable upon implementing the practice and listening condition with no frequency jumps or celeration turns in the data. The data jumped-down on the fourth session of the condition and remained stable for two consecutive days. With the exception of an outlier of two recalls, a jump-up turn-up
occurred for the remaining two sessions of the condition. The value of the slope of the turn-up was X 1.8.
Michelle's correct recalls averaged 5.1 with a spread of 2 to 7 information points per minute. Michelle's mean frequency of incorrect information points recalled was .66 ranging from 0 to 2 per minute.

Michelle's correct generality probe recalls jumped-up and turned-up across the first two sessions that these data were collected. A turn-down occurred on the third and fourth sessions of generality probe data collection with a slope of + 4.5. Correct recalls jumped-up on the final day of this condition. Michelle's mean frequency of correct generality probe information points recalled was 11.4 with a spread of 7 to 15 information points per minute.

Listening Only 2. With the introduction of this condition, no frequency jump occurred in the number of information points recalled. The final two sessions show a frequency jump-up, celeration turn-up in the amount of information points recalled with a slope value of X 2.6. Michelle's correct recalls averaged 10 with a spread of 7 to 14 information points per minute. Michelle's mean frequency of incorrect information points recalled was .16 ranging from 0 to 1 per minute.

Michelle's correct generality probe recalls jumped-down on the first day of data collection in this condition. A turn-up occurred on the second day of data collection with a slope of X 5. Michelle's correct recalls jumped-
down from 15 to 3 correct recalls on the final day of data collection. Michelle's mean frequency of correct generality probe information points recalled was 7.3 with a spread of 3 to 15 information points per minute.

**Andy**

**Listening Only.** Andy experienced much bounce with his text-based recalls during 5 sessions of listening only. Andy recalled between 2 and 8 correct text-based information points. Andy's frequency of correct recalls jumped-down during the final two days of the condition from 5 to 2 recalls per minute. The slope of correct recalls was \( \pm 3.5 \). Andy's mean frequency of correct recalls was 4.5 with a spread of 2 to 8 information points per minute. Andy's mean frequency of incorrect information points recalled was .6 with a spread of 0 to 2 per minute.

Andy's correct generality probe recalls turned-up, with the exception of one outlier of 7 recalls, with a slope of \( \times 1.1 \). Andy's mean frequency of correct generality probe information points recalled was 10.7 with a spread of 7 to 14 information points per minute.

**Instruction and Listening.** Upon the initial implementation of this condition, Andy experienced a frequency jump-up in text-based recalls. During the first two days of this condition, Andy recalled 2 to 4 correct information points per minute. A turn-up occurred on the third session of this condition. The value of the slope of the celeration was \( \times 2.5 \) for the remaining six sessions.
Figure 4.10: Andy's correct text-based recalls chart
At this point Andy dropped out of the study for 3 weeks. On the first day of resuming participation in the study, Andy's recalls remained stable at 5 information points. A celeration turn-down then occurred across the next four sessions with the a slope value of $\pm 4.5$. On the final day of this condition, correct recalls jumped-up from 0 to 4. Andy's mean frequency of correct recalls was 3.4 with a spread of 0 to 6 information points per minute. Andy's mean frequency of incorrect information points recalled was $0.7$ with a spread of 0 to 3 per minute.

Andy's frequency of correct generality probe recalls jumped-down with a celeration turn-up on the first and second session these data were collected. The slope of the turn-up was $X 3$. Upon returning after a three week absence, Andy's frequency of correct generality probe recalls jumped-down with a celeration turn-up of $X 4$. Andy's frequency of correct recalls turned-down during the final three days of the condition with a slope of $\pm 3.5$. Andy's mean frequency of correct generality probe information points recalled was 7.3 with a spread of 5 to 12 information points per minute.

**Practice and Listening.** There was a frequency jump-up in correct recalls upon the introduction of this condition. Andy recalled 10 information points on the first and only day of this condition. Andy's mean frequency of correct recalls was 8 with a spread of 6 to 10 information points.
per minute. Andy’s mean frequency of incorrect information points recalled was .8 with a spread of 0 to 2 per minute.

Andy’s frequency of correct generality probe recalls jumped-up with a celeration turned-down across the only two days that these data were collected. The slope of the turn-down was \( \pm 3 \). Andy’s mean frequency of correct generality probe information points recalled was 6.5 with a spread of 6 to 7 information points per minute.

Ken

Listening Only. There was considerable bounce in Ken’s text-based recalls. Ken recalled 0 to 12 information points during the first three days of this condition. A jump-down occurred on the fourth day from 12 to 4 and remained stable with a \( \times 1.0 \) celeration for three consecutive days. A jump-up then occurred to 12 information points for the next five sessions and again remained stable with a \( \times 1.0 \) celeration value. Ken’s recalls turned-down over the next three sessions with a slope value of \( \pm 2.0 \). Ken’s frequency of correct recalls jumped-up with a celeration turn-down for the remaining two days of this condition, with a slope value of \( \pm 30 \). Ken’s mean frequency of correct recalls was 8.7 with a spread of 0 to 18 information points per minute. Ken’s mean frequency of incorrect information points recalled was .38 with a spread of 0 to 3 per minute.

Ken’s correct generality probe recalls remained relatively stable with a slope of \( \pm 1.2 \) across the first
Figure 4.11: Ken's correct text-based recalls chart
five sessions these data were collected. With the exception of an outlier in which Ken recalled 21 correct information points, a celeration turn-up in Ken's data occurred with a $X^2$ slope value. A celeration turn-down occurred across the final two days with a slope of $+2.3$. Ken's mean frequency of correct generality probe information points recalled was 13.4 with a spread of 7 to 23 information points per minute.

**Instruction and Listening.** Upon the initial implementation of this condition, Ken's recalls remained stable with no frequency jumps or celeration turns. A frequency jump-down and celeration turn-up occurred across the next three sessions. The slope value was $X 100$. Ken's frequency of correct recalls again jumped-down with a celeration turn-up beginning on the fifth session and lasted for four sessions. The value of the second turn-up was $X 1.8$. The frequency of Ken's recalls jumped-down with a celeration turned-up for a third time on the ninth session of this condition. The value of the celeration turn-up was $X 3.5$. Ken's mean frequency of correct recalls was 11.9 with a spread of 5 to 23 information points per minute. Ken's mean frequency of incorrect information points recalled was .43 with a spread of 0 to 2 per minute.

Ken's frequency of correct generality probe recalls jumped-up with a celeration turned-up across the first four days that these data were collected with a slope of $X 1.6$. Correct recalls jumped-down with no-turn on the final two
days of data collection with a slope of X 1.0. Ken's mean frequency of correct generality probe information points recalled was 16 with a spread of 11 to 22 information points per minute.

**Practice and Listening.** Ken recalled 3 information points on the first day of this condition, a frequency jump-down of 9 information points. Ken recalled 26 and 15 information points respectively during his final two sessions. Ken's mean frequency of correct recalls was 14.6 with a spread of 3 to 26 information points per minute. Ken's mean frequency of incorrect information points recalled was .16 with a spread of 0 to 1 per minute.

No frequency jump or celeration turn in Ken's correct generality probe recalls occurred on the first day of this condition. Beginning the second day, Ken's frequency of correct recalls jumped-up with a celeration turn-up of X 1.2. Ken's mean frequency of correct generality probe information points recalled was 20 with a spread of 13 to 26 information points per minute.

**Tammy**

**Listening Only.** Tammy's text-based recalls remained relatively stable across 5 sessions, recalling between 5 and 13 information points per minute. Tammy recalled twice as many information points during the second session of this condition as she did during the first. For the remaining sessions, correct recalls spread from 10 to 13 per minute. Tammy dropped out of the study for four weeks.
Figure 4.12: Tammy's correct text-based recalls chart
following the fourth session. Upon returning, Tammy’s recalls remained stable at 13 correct recalls per minute. Tammy’s mean frequency of correct recalls was 9.8 with a spread of 5 to 13 information points per minute. Tammy’s mean frequency of incorrect information points recalled was 2.1 with a spread of 0 to 4 per minute.

Tammy’s frequency of correct generality probe recalls turned-up with a slope of X 15 across the first two sessions that these data were collected. Tammy recalled 14 additional correct generality probe text-based information points following a 4 week lapse in data collection. Tammy’s mean frequency of correct generality probe information points recalled was 12.7 with a spread of 2 to 25 information points per minute.

Practice and Listening. Correct recalls remained stable for the first five sessions of this condition. Beginning with the sixth session, a frequency jump-down, celeration turn-up occurred with correct recalls. The value of the slope was X 1.6. Tammy’s mean frequency of correct recalls was 12.3 with a spread of 8 to 16 information points per minute. Tammy's mean frequency of incorrect information points recalled was 1.25 with a spread of 0 to 5 per minute.

Tammy's frequency of correct generality probe recalls jumped-down with a celeration turned-down across the first four sessions these data were collected, with a slope of ± 1.6. A frequency jump-up, celeration no-turn occurred on
the fifth day these data were collected. A frequency jump-
down occurred on the final day of data collection. Tammy's
mean frequency of correct generality probe information
points recalled was 11.7 with a spread of 7 to 14
information points per minute.

Listening Only 2. Tammy's frequency of correct text-
based recalls jumped-up upon the introduction of the second
book. Tammy recalled 17 correct text-based information
points during her first and only session of this condition,
while recalling 5 incorrect information points.

Tammy's frequency of correct generality probe recalls
jumped-up on the only day of data collection. Tammy
recalled 23 correct generality probe information points.
<table>
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<td>(8)</td>
<td>—</td>
<td>(8)</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Note: LO₁ = listening only, I&L = instruction and listening, P&L₁ = practice and listening, LO₂ = listening only condition with second book, P&L₂ = practice and listening condition with second book

Table 4.8: Mean and range of correct text-based information points recalled from orally presented (hear-say channel) text per condition. Range reported in ( ).
<table>
<thead>
<tr>
<th>Participant</th>
<th>L. O.₁</th>
<th>I &amp; L</th>
<th>P &amp; L₁</th>
<th>L. O.₂</th>
<th>P &amp; L₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robin</td>
<td>9</td>
<td>10</td>
<td>13</td>
<td>7.3</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>(6)</td>
<td>(6)</td>
<td>(6)</td>
<td>(8)</td>
<td>(5)</td>
</tr>
<tr>
<td>Donna</td>
<td>7</td>
<td>6.8</td>
<td>15.2</td>
<td>7.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(9)</td>
<td>(7)</td>
<td>(11)</td>
<td>(5)</td>
<td></td>
</tr>
<tr>
<td>Michelle</td>
<td>9.3</td>
<td>11.4</td>
<td>11.4</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3)</td>
<td>(15)</td>
<td>(8)</td>
<td>(12)</td>
<td></td>
</tr>
<tr>
<td>Andy</td>
<td>10.7</td>
<td>7.3</td>
<td>6.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(7)</td>
<td>(7)</td>
<td>(1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ken</td>
<td>13.4</td>
<td>16</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(16)</td>
<td>(11)</td>
<td>(13)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tammy</td>
<td>12.7</td>
<td></td>
<td>11.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(23)</td>
<td></td>
<td>(7)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: L₀₁ = listening only, I&L = instruction and listening, P&L₁ = practice and listening, L₀₂ = listening only condition with second book, P&L₂ = practice and listening condition with second book

Table 4.9: Mean and range of correct text-based information points recalled from generality probe (see-say channel) text per condition. Range reported in ( ).
Table 4.10: Text-based celeration values across conditions and participants for orally presented passages. Celeration values represent overall celeration for each condition. Celeration is defined as the angle of the slope whose value indicates how much behavior is multiplying or dividing per week.

a) Only data for the first 3 weeks of this condition were used in the calculation of the slope value.

<table>
<thead>
<tr>
<th>Participant</th>
<th>L. O.₁</th>
<th>I &amp; L</th>
<th>P &amp; L₁</th>
<th>L. O.₂</th>
<th>P &amp; L₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robin</td>
<td>X 1.1</td>
<td>÷ 1.3</td>
<td>X 1.5</td>
<td>÷ 1.4</td>
<td>X 1.2</td>
</tr>
<tr>
<td>Donna</td>
<td>X 1.0</td>
<td>X 1.0</td>
<td>X 1.0</td>
<td>÷ 1.4</td>
<td></td>
</tr>
<tr>
<td>Michelle</td>
<td>X 1.1</td>
<td>X 1.1</td>
<td>X 1.0</td>
<td>X 1.1</td>
<td></td>
</tr>
<tr>
<td>Andy</td>
<td>÷ 3.5</td>
<td>X 1.5ᵃ</td>
<td>÷ 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ken</td>
<td>X 1.0</td>
<td>X 1.1</td>
<td>X 2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tammy</td>
<td>X 1.0</td>
<td></td>
<td>X 1.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: LO₁ = listening only, I&L = instruction and listening, P&L₁ = practice and listening, LO₂ = listening only condition with second book, P&L₂ = practice and listening condition with second book.
<table>
<thead>
<tr>
<th>Participant</th>
<th>L. O.₁</th>
<th>I &amp; L</th>
<th>P &amp; L₁</th>
<th>L. O.₂</th>
<th>P &amp; L₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robin</td>
<td>X 1.0</td>
<td>X 1.0</td>
<td>X 1.0</td>
<td>÷ 1.5</td>
<td>X 1.1</td>
</tr>
<tr>
<td>Donna</td>
<td>X 1.2</td>
<td>X 1.0</td>
<td>X 1.0</td>
<td>X 1.1</td>
<td></td>
</tr>
<tr>
<td>Michelle</td>
<td>÷ 1.1</td>
<td>÷ 1.1</td>
<td>X 1.0</td>
<td>X 1.1</td>
<td></td>
</tr>
<tr>
<td>Andy</td>
<td>X 1.1</td>
<td>X 1.8ᵃ</td>
<td>÷ 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ken</td>
<td>X 1.1</td>
<td>÷ 1.1</td>
<td>X 1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tammy</td>
<td>X 1.15</td>
<td></td>
<td></td>
<td>÷ 1.1</td>
<td>X 2.6</td>
</tr>
</tbody>
</table>

Note: LO₁= listening only, I&L= instruction and listening, P&L₁= practice and listening, LO₂= listening only condition with second book, P&L₂= practice and listening condition with second book.

Table 4.11: Text-based celeration values across conditions and participants for generality probe passages. Celeration values represent overall celeration for each condition. Celeration is defined as the angle of the slope whose value indicates how much behavior is multiplying or dividing per week.

a) Only data for the first 3 weeks of this condition were used in the calculation of the slope value.
Social Validity

After the completion of the study, the classroom teacher and participants were asked to complete a questionnaire assessing the satisfaction with the intervention.

Student Responses to Social Validity Questionnaire

Table 4.12 summarizes the participants' responses to questions addressing the procedures employed in this study. Most participants responded favorably to the study's procedures. All students liked receiving rewards at the end of each week from the "treasure box". When asked what each liked least, only Andy and Tammy gave a response. Andy stated that he did not like being pulled out of the classroom when he was trying to do work. Tammy liked least being asked to tell as much as she knew about a topic she knew little about. When asked what they would change if they could, only Tammy responded. Related to the previous question, Tammy stated that she would not want to be asked to recall information about topics she does not know.

All students thought that participating in the study helped improve their reading skills. Furthermore, all said they would participate again in the study if they had the chance and thought they learned something useful.
<table>
<thead>
<tr>
<th>Questions</th>
<th>Definitely</th>
<th>Probably</th>
<th>I'd think about it</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What did you like best about this study?</td>
<td>&quot;Coming downstairs and practicing reading. I also liked Fridays when we got prizes.&quot; (Robin and Donna)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;Trying to remember what I read and the prizes.&quot; (Michelle)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;Telling you what I knew about New Jersey. I liked getting the prizes from the box on Fridays too.&quot; (Andy)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;Reading as fast as I could.&quot; (Ken)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;Practicing reading the bear information and telling you what I remembered. I also liked choosing a prize from the box.&quot; (Tammy)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. What you liked least about this study?</td>
<td>&quot;Being pulled out of class when I was trying to do work.&quot; (Andy)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;I didn't like it when you kept asking me to tell me all I knew about bears when I didn't know anything about bears.&quot; (Tammy)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. If you could change any part of this study, what would you change?</td>
<td>&quot;That you wouldn't ask me about things I don't know about&quot; (Tammy)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.12 continued...
Table 4.12 continued...

4. Do you believe that what you learned in this study will help you in school in the future? Why or why not?

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Yes, because I practiced reading and remembering&quot; (Robin)</td>
<td>&quot;Yes, because I was able to read faster everyday&quot; (Donna)</td>
<td>&quot;Yes, because I think I read better&quot; (Michelle)</td>
<td>&quot;Probably because I was able to remember more as I practiced&quot; (Andy)</td>
</tr>
<tr>
<td>&quot;Yes because I learned a lot about crickets and I might need that someday&quot; (Ken)</td>
<td>&quot;Yes. I got better at remembering information about bears so I became a better reader&quot; (Tammy)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. I would participate in this study again.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

6. I learned something useful from my participation in this study.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4.12: Participants' responses to social validity questionnaire.
Teachers Responses to Social Validity Questionnaire

Table 4.13 summarizes teacher responses to a social validity questionnaire. The teacher indicated that the procedures used in this study would not likely be useful to him since he uses a Direct Instruction reading program in his classroom. Since this instructional package has preprogrammed comprehension questions, the procedures used in the present study would, according to the teacher, probably not be used. He did indicate that the students probably learned useful skills since they practiced those skills weekly in addition to his instruction.
<table>
<thead>
<tr>
<th>Questions</th>
<th>Definitely</th>
<th>Probably</th>
<th>Maybe</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>la. Were the procedures used in this study feasible to use in your classroom?</td>
<td>&quot;No&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lb. If not, what changes would need to be made to make it a more practical classroom procedure?</td>
<td>&quot;Since I use the direct instruction reading program, comprehension checks are already built in so I wouldn't need to use it&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Is it likely that you would use this procedure in your classroom as a compensatory form of instruction?</td>
<td>&quot;No&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I believe my student(s) learned something useful by participating in this study.</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4.13: Teacher responses to social validity questionnaire
CHAPTER 5
DISCUSSION

This chapter discusses the results of this study that investigated the effect of instruction and listening and practice and listening on the recall of text-based and thematic information points. Since this dissertation is a dissertation in the area of reading, and given the procedures, dependent variables employed, and the theoretical research base to which it is related, specifically schema theory, the reader may be tempted to infer that given the steeper celerations that occurred with some of the participants, these strategies may have resulted in better comprehension. Information recall, however, is not equivalent to comprehension. Comprehension skills are acquired as a result of becoming a more proficient reader, which is the result of multiple instructional strategies consistently applied over extended periods of time. Recall of information points, as defined in this study, is an outcome resulting from two specific instructional strategies. Recall skills are one component of the comprehension process. To what degree the development of these component skills may influence other skills included in the class of skills we call comprehension is unknown. The results are discussed in relation to the six research questions posed in chapter 1.
Research Question One

What will be the number of correct and incorrect text-based and thematic information points recalled in a minute from an oral presentation of a passage?

In the listening only conditions, text-based recalls were well below the established fluency standard for factual recall, which is between 15-30 facts per minute. The participants' textual recall performance may have been influenced by a couple factors.

Literal comprehension of text involves the ability to recall factual information. It is generally understood that literal comprehension skills provide the basis for higher-level comprehension skills (McCormick, 1995). Moreover, vocabulary knowledge is one of the best predictors of verbal ability (Daneman, 1988). Vocabulary knowledge and text difficulty, however, interact to influence reading fluency and subsequently, comprehension ability (Cunningham, & Moore, 1993; Stahl, Jacobson, Davis, & Davis, 1989). As mentioned in Chapter 3, the participants in this study were chosen partly through teacher identification. The participants included in the study were in the teacher's lowest reading group.

It is not unreasonable to assume a lower vocabulary knowledge base in students who are less proficient readers. If this was the case with the participants of the current study, then a difficult text would result not only in fewer
words read per minute, but a lack of understanding of a greater number of words. Even though the participants listened to the text for the majority of the sessions, a lack of understanding of the text would still adversely affect the number of correct pieces of information recalled. The Fry readability scale (Fry, 1974) was used to determine approximate reading level for passages used in the listening only phase. The results indicate approximately a fifth grade level. The participants were in fourth grade. Related to thematic recalls, studies have shown that prior knowledge of the topic may interact with text-difficult to influence recall (Stahl, et al., 1989).

While there are no established fluency standards for thematic recalls, less than ten correct recalls, regardless of the domain, can safely be considered substantially below fluency. The average number of correct thematic information points recalled across participants was 4.6. That the thematic recalls were low is consistent with the literature base examining the relation between background knowledge and word knowledge (Stahl, et al., 1989). Even though thematic recall was low, it is worth discussing Donna's performance in the second listening only condition.

In the second listening only condition, Donna's correct thematic recalls evidenced a celeration of X 8. This resulted from Donna recalling old text-based information that was then considered thematic. Text-based information was recorded for the thematic prompt only if textual information
from that days text was recalled. Textual information recalled on subsequent days, if not also included in that days text, was considered thematic information. In the absence of notable celeration values, Tammy recalled the highest number of correct thematic information points during the listening only condition.

With the exception of one day, Tammy recalled at least 10 correct thematic information points. However, repeatedly asking her to tell me as much as she could related to the topic, resulted in a certain degree of frustration being elicited. Beginning with the fourth passage, when she was asked to, "Tell me anything else you know about bears", she replied, "I don't know nothing else, that's all I told you the first time we did this." Tammy completed six additional passages before dropping out of the study for a month.

Research Question Two

What effects will an oral presentation of thematic information points by the experimenter have on the number of correct and incorrect text-based and thematic information points recalled in a minute?

The presentation of thematic information points was correlated with a slight increase in the number of correct text-based information points recalled. The overall frequency and dimensional quantities of text-based recalls did not change. This was not the case for thematic recalls.
The overall number of correct thematic recalls jumped-up substantially. Typically, participants recalled 15.5 correct thematic information points per minute, 3.4 times as many correct thematic information points compared with the listening only phase. The disparity in the magnitude of the jump-up in correct thematic information points compared with text-based information points is not surprising. Studies have demonstrated the relative functional independence of instruction designed to improve specific and general domain knowledge (Stahl, Jacobson, Davis, & Davis, 1989; Stahl, Hare, & Sinatra, 1991). This functional independence is, however, not by any means complete.

The larger a person's knowledge base in relation to a particular topic, the more words they generally know (Stahl, et al., 1989). Michelle and Ken recalled more correct text-based information points in the instruction and listening phase compared with the listening only phase. This may have resulted due to exposure to words related to the subject matter that shared characteristics with textual material. That the words used for background knowledge instruction were part of the same class of words, having this knowledge base may have increased the likelihood of an intraverbal relation being established, thereby increasing the likelihood of any words in that class being evoked. It should also be noted that a good deal of bounce (i.e., session-to-session variability) existed in the text-based recall.

Comparatively, a visual inspection of the thematic recall
data indicate that the amount of bounce that existed in the listening only conditions reduced substantially once the instruction and listening condition was introduced.

Celeration turn-ups were also evident in all the participants thematic recalls. During the second week of instruction and listening, Andy began inquiring as to how much longer we were going to be in this condition. Virtually with each passing day, Andy recalled an additional one or two thematic information points from the prereading instructional session. This type of daily improvement in thematic recall performance was also evident with Michelle and Ken, but was not as pronounced or consistent with Robin or Donna.

Research Question Three

What effects will practicing (see-to-say) thematic information points have on the number of correct and incorrect text-based and thematic information points recalled in a minute from an oral passage presentation by elementary age students?

Active responding has been associated with increased student performance across a number of skill areas (Belfiore, Skinner, & Ferkis, 1995; Beltran, 1995; Cavanaugh, Heward, & Donelson, 1996; Gardner, 1994; Heward, 1994; Tudor, 1995). The results of the present study support the general conclusion that the more responses a student makes to the instructional material, the higher the academic performance. Overall, participants recalled 7 more correct thematic
information points per minute in the practice and listening condition compared with the instruction and listening condition.

Consistent with the effects observed in the instruction and listening condition, a corresponding increase in the number of correct text-based information points occurred. Participants recalled, on average, 1.2 more correct text-based information points per minute in the instruction and listening phase. This increase in correct text-based information points recalled was also associated with an increase in bounce for Michelle and Robin.

Research Question Four

What will be the number of correct and incorrect text-based and thematic information points recalled in a minute from a see-to-say learning channel set?

All participants recalled more correct text-based information points per minute when they read the text compared to when the text was read to them. Given that two 1-minute repeated reading practice readings were provided as a warm-up activity, these results would be expected. Error correction was provided during the two 1-minute repeated reading timings for any unknown or incorrect reading of words prior to the taped 1-minute timing. Hence, two error correction antecedent-behavior-consequence learning trials were provided. A higher frequency of correct text-based recalls under these circumstances is consistent with previous
findings. The Belfiore, Skinner, and Ferkis, (1995) study that found higher rates of cumulative mastery of sight word recognition when complete antecedent-response-feedback sequences were provided compared with a repeated response only condition.

There was little difference in the number of correct thematic information points recalled under the generality probe condition compared with when passages were read to the participants. Correct generality probe thematic recalls tracked thematic recalls to orally presented text. This further provides support for the notion of providing direct instruction for the skills one wants students to learn. Similar to the practice of thematic information points, practicing via repeated readings led to an increase in the number of correct text-based information points recalled per minute but not thematic information points. These results also support the notion of the relative independence of background knowledge and word recognition skills. Participants recalled more correct generality probe text-based recalls more often compared with text-based recalls to orally presented text.
Research Question Five

What effects will an oral presentation of thematic information points by the experimenter have on the number of correct and incorrect text-based and thematic information points recalled in a minute from a see-to-say learning channel set?

Recall of correct text-based information points increased slightly for Michelle for five consecutive sessions. Upon listening to a selected sample of text-based recalls from the generality probe passages, it was noted that a greater number of text-based information points were clustered into two or more information points compared with when the passages were read to the participants. What this means is that two or more information points occurring sequentially in the text were recalled at the same time. This suggests that the quality of the recalls, defined as the extent to which information points, or components of story events, were recalled more closely to the actual sequence of events when Michelle read the text than when she listened to the text. Qualitative analyses of free recalls has been conducted in previous research by Stahl et al., (1989).

Stahl examined, in part, the effect of easy and difficult vocabulary passages on the free recall of textual information 24 hours later. Textual difficulty was found to adversely affect the amount of information recalled in order of occurrence, with less information being recalled in order
with the more difficult text. They surmised that one possible reason for the disorder recall was an inability to develop a coherent text base from the passage. Repeated readings of difficult text may ameliorate this effect to a certain extent.

While not the purpose of the present study, that more information points were clustered during the generality probe see-say learning channel set compared with the hear-say learning channel set, seems to suggest that sufficient stimulus control with difficult textual material may be developed via a repeated reading procedure. That the frequency of correct text-based recalls jumped-down during the last three sessions these data were collected suggests that the frequency jump-up may have had more to do with the type of information in those passages than the presentation of thematic information points. Since, by definition, the thematic information points were not included in the text, presentation of thematic information points would not be expected to enhance stimulus control over textual material, and hence improve recall of text-based material.

For all participants, correct thematic information recalled after reading a passage tracked the celeration slope of correct thematic information recalled after listening to a passage. This might be expected since correct thematic information points were the same regardless of whether the participants read or listened to the text. Furthermore, an overall celeration turn-up occurred for all participants who
experienced the instruction and listening condition. This effect was independent of correct text-based recalls. Michelle's celeration of correct text-based recalls in the instruction and listening condition, for instance, was X 1.1, while the celeration of correct thematic recalls was X 1.5. While this difference does not seem substantial, one must remember that these are overall celeration values and are not sensitive to frequency jumps and celeration turns within each phase. For example, a X 2.0 celeration in Michelle's correct thematic recalls occurred during the second full week of this condition. The same cannot be said for correct text-based recalls. Another dimensional quantity that was affected by the introduction of instruction was bounce.

For three participants, the amount of bounce in correct thematic recalls reduced substantially once the instructional component was introduced. For all five participants, the amount of bounce in correct text-based recalls remained virtually unchanged. The reduction in the amount of bounce in correct thematic recalls suggests an increase in stimulus controlled responding resulting from establishing an intraverbal repertoire via instruction.
Research Question Six

What effects will practicing thematic information points have on the number of correct and incorrect text-based and thematic information points recalled in a minute by elementary age students from a see-to-say learning channel set?

A consistent finding across phases has been the relative independence of thematic and text-based performances in relation to the instruction provided. When the practice and listening condition was instituted, there was virtually no change in the celeration values of correct text-based recalls. While more correct thematic information points were recalled in the practice and listening phase compared with the instruction and listening phase, there was a clear differential effect. For instance, Michelle's correct text-based recalls remained unchanged from the instruction and listening to the practice and listening phase for passages read. Comparatively, Michelle recalled 3.5 times as many correct thematic information points compared with the instruction and listening phase. Tammy's frequency of correct thematic recalls also jumped-up with a corresponding celeration turn-up. Donna's frequency of correct thematic recalls also jumped-up slightly. The accelerated learning curves corresponding to the introduction of the practice component is consistent with the active student responding research base.
For instance, Beltran (1995) analyzed the effect of reading science terms and stating their definitions 0, 1, or 3 times. Fifteen science terms were taught per week, five per condition. She found faster acquisition rates and better overall maintenance with science terms read 3 times compared with reading them 1 or 0 times. The present study's findings also indicate higher achievement correlated with higher levels of practice, in this case, more correct thematic and text-based recalls occurring when the students practice reading the material compared with when they listen to the material being read.

When comparing correct thematic information points recalled, no substantial difference was found between reading or listening to passages read. The difference was found in whether the participants read or listened to thematic background information points. An unexpected benefit was also found with the practice and listening activity in relation to thematic information points.

Tammy, who had previously dropped out of the study, rejoined and, in the absence of any instruction, continued to exhibit frustrating responses such as sighs and pauses before recalling any information about bears that she knew. Given her intolerance with this procedure, and the limited time available in the study, the experimenter decided to begin the practice and listening phase shortly after Tammy rejoined the study. Within three days, Tammy's recalls and her affect improved substantially. When asked to tell me anything else
about bears, she would sit straight in her chair, her eyes would widen, and a smile would cross her face. She seemed to glean some enjoyment from this procedure by trying to beat her best recall score from the previous day. The same reaction occurred when I gave her the background information sheet and ask her to read as many information points as she could in a minute. She always commented that she had read an additional point or two after each 1-minute timing. Incidentally, upon rejoining the study she told the experimenter that she "wasn't very good at school." This may explain why she dropped out of the study just one week after it commenced. She was unable to recall any new information points about bears and, given her perceived lack of success in school, she was unable to "persistent" under those conditions. Her previous flat affect returned upon changing books and reinstating the listening only phase.

Limitations of the Study

There were a number of limitations to this study including time limitations, setting, condition changes, minimal instruction, simple see-say reading of information points, ceilings, uncontrolled interactions among participants, the length of the study, few maintenance probes, potential sequence effects, and variable number of text-based information points.
Time limitations

Due to limited opportunities to pull the children out of their classroom, it quickly became apparent that without pulling 2 children simultaneously, there would not be enough time in the school day to conduct sessions with all the participants. Therefore, participants were brought down in pairs beginning the third week of the study. The pairs consisted of Robin and Donna, Ken and Andy, and Michelle and Tammy. Due to the fluctuating school schedules for each participant, the experimenter was unable to maintain the coherence of these pairs for the duration of the study. This resulted in occasionally bringing down a pair that were working with the same book, but different passages. This may have resulted in one of the pairs overhearing thematic recalls before their session began. The experimenter attempted to control for this by requiring the second student to find an activity and then go to a table on the other end of the basement. The student did not always remain on that side of the basement for the duration of their cohort's session. However, one might expect spikes in the number of correct thematic information points recalled if this variable actually influenced the number of correct thematic information points recalled per minute. A closer inspection of the data fail to reveal spikes in correct thematic information points recalled across conditions and participants.
Setting

Sessions were conducted in the school basement. The basement was also used for other activities such as other tutoring activities, securing art supplies that occasionally included ripping construction paper, and pulling items off the shelves. The extent to which these activities interfered with the participants' ability to recall correct information points is unclear.

Condition Changes

For Donna, Michelle, and Ken, upon a post hoc analysis of the data, it was discovered that condition changes occurred when a celeration greater than X 1.2 was evident. For instance, Donna's instruction and listening condition was introduced after a jump-up in thematic recalls. While an overall frequency jump-up and celeration no-turn occurred in this phase, it is unclear whether that level of responding would have been achieved in the absence of the instruction and listening condition. A jump-up in Donna's correct thematic recalls also occurred on the final day of the practice and listening condition. This is cause for less concern because the condition introduced listening only and subsequently a new book was introduced.

While Michelle's correct thematic recalls were stable before the introduction of the instruction and listening condition, the steady state was only maintained for two, rather than the standard three sessions. It is unclear whether a frequency jump-up would have occurred on the third
day in the absence of the condition change. On the final day of the instruction and listening condition, a jump-down occurred, resulting in a deceleration of $\pm 1.8$. The celeration of the subsequent practice and listening condition was approximately the same as the celeration of the previous instruction and listening condition. It is unclear whether a jump-up would have occurred and the celeration course would have resumed without the introduction of the practice and listening condition.

A frequency jump-down occurred on Ken's final session of the listening only condition. The frequency jump-up on the initial session of the instruction and listening condition was within the bounce of the previous two sessions. It is unclear whether this jump-up would have occurred in the absence of the instruction and listening condition. However, excluding the final jump-down in the listening only condition, the celeration of the previous three sessions was $\times 1.1$. Excluding the first session of the instruction and listening condition, the slope of the celeration was $\times 1.8$. This suggests that the turn-up occurred as a result of the instruction and would not have occurred if conditions remained unchanged.

**Minimal Instruction**

Minimal formal instruction over background information points occurred. No more than 4-minutes of instruction occurred before each reading of a passage. Further explanation of each information points may have produced
steep slopes in thematic recall. Technically, this would have occurred as a result of explicitly teaching and establishing an intraverbal repertoire (Skinner, 1957).

**Simple See-Say Responding to Background Information**

During the practice condition, the participants simply read the background information points. It is not known whether reading through the background information points as if they were an outline to a talk would have further facilitated the establishment of an intraverbal chain, thereby evoking other, previously unspoken, thematic information points.

**Ceilings**

Michelle's top recall during the practice and listening phase was 34 correct responses per minute. This steady state responding that permitted the introduction of a new book, was an artifact of the procedure. There were 34 information points on the background information sheet. Michelle simply memorized and recalled, virtually in order, each information point. It is not known whether a modification in the procedure would have resulted in higher recall rates.

**Uncontrolled Interactions Among Participants**

Since the participants were classmate, and friends outside of school, it is possible that some of the changes in celeration was due to discussion of the information outside of the confines of the study.
Length of the study

The study ended shortly after Robin, Donna, and Michelle began a new book. It is not known whether a direct replication of the effects of the instruction and listening and practice and listening conditions would have occurred.

Maintenance Probes

While generality probes were conducted to assess the potency of the interventions, more generality probes with longer intervals of time from the last instructional or practice session would have provided useful information regarding the relative effectiveness of the interventions across participants.

Potential Sequence Effects

With the exception of Tammy, all participants, received both treatments in the same order. This precludes the ability to determine the relative effectiveness of the practice component in the absence of potential instructional carryover effects. Specific concerns lie with the fact that all participants repeatedly listened to the thematic information points before they read them. It is possible that the listening comprehension skills of the participants, coupled with the repeated presentation of the background information points, influenced the celeration values obtained when the practice component was introduced. Whether this was a positive or negative influence is unknown. For instance, would similar celeration values be obtained in the practice and listening condition if presented before the instruction
and listening condition? Would following the practice and listening condition with the instruction and listening condition result in steeper or flatter slopes during the instruction and listening condition? These questions cannot be answered in the present study. Tammy's performance may, however, provide some insights.

Tammy's celeration value for the listening only condition for the first four sessions was $+1.8$. Upon the introduction of the practice and listening condition, the frequency of her correct thematic recalls jumped-up and the celeration value turned-up at a value of $X = 2.3$. The value of the slope turned-down as her correct thematic recalls approached 35 correct per minute. Similar celeration values were found within the instruction and listening condition with Ken, Michelle, and Andy. Whether similar celeration values would have continued if the instruction and listening condition followed the practice and listening condition is unknown.

**Variable Number of Text-Based Information Points**

Across all participants, correct text-based information points exhibited much bounce. A factor that may have influenced this is the range of information points included in each passage. For generality probe passages, the number of text-based information points ranged as much as 23 points per passage. Further, qualitative aspects of the information points may have influenced the number of correct information points recalled. For instance, the number of correct text-
based information points from orally presented passages Andy recalled toward the end of the instruction and listening condition evidenced a clear deceleration. At that point in the study, we were reading the final chapter of From sea to shining sea: New Jersey (Fradin, 1993), and only factual information such as names, dates, and specific accomplishments were presented. Andy had difficulty recalling factual information presented in such a manner.

Implications for the Classroom

The simplicity of the practice and listening procedure lends itself to easy modification for classroom use. Prereading practice with background information points directly related to the content in the text would take little more than 5 minutes of prereading class time. Brief explanation of important concepts before practice may enhance the procedures efficacy. There are a couple of ways teachers can implement the practice and listening procedure into their classrooms.

First, teachers can conduct a whole class 1-minute timing procedure. This would entail each student reading the background information points either orally or silently. A reading of the text would follow. One-minute recalls could be conducted by peers. This has the benefit of promoting peer interaction and potentially developing beginning instructional skills. Another benefit is that this type of peer interaction may promote question asking.
A second potential classroom application of the procedure is to have students time each other in the practice of reading the background information points and post reading recalls. This would not only facilitate social interaction in a constructive manner, but it would provide them practice with following a procedure which many adults need to do to be successful at their chosen profession. It also may teach the importance of attending to details, a skill that is difficult to acquire.

The practice and listening method can easily be introduced into routine classroom instructional activities. Research has shown the effectiveness of peer tutoring strategies (Barbetta, Miller, Peters, Heron, & Cochran, 1991; Franca, Kerr, Reitz, & Lambert, 1990). Pairs of students could be used to instruct and time each other before a reading episode. This would not only provide practice with background information points but increase the likelihood of successfully understanding the content.

Suggestions for Future Research

The practice and listening condition required the students to orally read the background information points for 1-minute. The effectiveness of a silent reading procedure is unknown. Modifying the procedure for classroom use, as described above, and requiring the students to read the background information points orally, could potentially serve as a fluency blocker. Reading the information points silently would be more conducive to whole class instruction.
As mentioned above, the students read the background information points in a simply see-say mode. This does not approximate the way one would use, for instance, an outline to guide a talk. Using the background information points as an outline to guide an explanation of the topic, may very well result in steeper slopes and a verbal repertoire under better stimulus control of prompts that only vaguely resemble the topic. This type of stimulus control would likely result in a greater array of stimuli acquiring evocative functions.

The enrichment of prereading instruction related to the background information points may also enhance the efficacy of the practice condition. It is not known from the present research whether explicitly relating the information points to each other would have resulted in a shorter acquisition time to fluency. While the experimenter used the information points to guide his instruction, explicit discussion of each information point did not occur.

The number of times, and hence, the amount of practice the participants received reading the background information points was determined by how much time was devoted to the corresponding instructional session. In the case of Tammy, since she did not receive instruction, only 1-minute was allotted to practice. Tiffany’s correct celeration multiplied by \( X \ 2 \). The differential effectiveness of different amounts of practice is not known with this procedure. Extrapolating from the established research base on active student responding, the more practice allowed, the
greater the number of information points that would likely be recalled. This is merely conjecture based on an established research base and remains an empirical issue at this point. Similar to the Beltran study, one might investigate the effects of reading through the background information list 1, 3, and 5 times. One limitation of this type of modification is that the standard 1-minute counting period would be difficult to maintain. Abandoning the 1-minute counting period would result in taking a constant time out of the rate of behavior. Each performance would, in essence, mean something different.

There were at least 31 thematic information points presented at one time. What might be the effect of providing fewer thematic information points? Would providing ten or fifteen thematic information points, thereby resulting in the list being read more frequently, result in steeper slopes in a shorter period of time? What effect might this have on the generation of correct thematic information not presented on the background information sheet? For instance, Tammy frequently generated correct thematic information points in addition to what was presented on the background information sheet. Thirty-one thematic information points were listed on background information sheet used with Tammy. The highest number of correct thematic information points recalled was 40. This is the result of Tammy combining the information points recalled in the listening only condition with the total number of information points she read in the practice
and listening condition. This spontaneous combination of a previous repertoire with a newly acquired repertoire either did not occur with the other participants or, when it did, occurred on a much smaller scale. Future research might investigate whether qualitative variables may control the adduction of an already established intraverbal repertoire with a newly acquired one, or whether providing a shorter list thereby resulting in more frequent readings of each information point would produce this result with different learners.

The participants were pulled out of their classroom and brought to a separate room where sessions were conducted. Implementing these procedures within a classroom setting would provide information on setting parameters under which these procedures remain effective. Teacher led implementation of the procedures in the context of whole class instruction would further add to identifying the range of settings that these procedures are and are not effective.

Summary

Reading comprehension research has resulted in the development of a number of theories, including schema theory and strategy-domain interactive theory, attempting to explicate the comprehension process. A consistent assumption underlying these theories is the importance of a sufficient degree of background knowledge. Reading and understanding the newspaper, magazine, or even a novel, often requires a certain degree of background knowledge. Insufficient
background knowledge may very well impede the reader's ability to understand what is written. Multiple skill areas such as vocabulary development, word recognition, and word identification all work in conjunction with the reader's background knowledge to facilitate understanding of the written word. Reading word for word, without the necessary background knowledge, may result in little more than word calling. To facilitate the acquisition and retention of needed background knowledge, and ultimately, the textual information itself, effective strategies are required.

The present study investigated the effects of listening only, instruction and listening, and practice and listening on the acquisition of correct thematic information points recalled with six elementary age students. All students experienced at least two conditions, the listening only condition and the practice and listening condition. During the listening only condition, the experimenter read a passage at a rate of 190-200 words per minute. The experimenter then asked the participant to recall as many facts and points about the passage as they could in a minute. The experimenter then asked the participant to say anything else about the topic that they knew in a minute. The same procedure was followed during the instruction and listening and practice and listening conditions.

In the instruction and listening condition, the experimenter used a background information sheet to guide his instruction about the selected topic. During the practice
and listening condition, the experimenter gave the background information sheet to the participants to read as many times they could in a minute. To eliminate the potential confound of differential amounts of exposure to instruction and practice, the amount of time devoted to instruction and practice was matched.

The results indicate that four of the six participants obtained higher frequencies of correct thematic information points recalled during the practice and listening condition than they did during the listening only or instruction and listening conditions. Furthermore, the practice and listening condition produced frequency jump-ups and celeration turn-ups, with four participants' correct thematic recalls compared with the listening only condition. These results suggest that requiring active responses on the part of students is more likely to result in higher levels of achievement compared with no responses being required. This is consistent with an established research base on active student responding.

Future research in the area of background knowledge instruction should concentrate on adapting the procedures to whole class instruction, requiring the students to actively participate in their learning trials. Finally, adapting these procedures to different subject matter areas, different learning channel sets, and different frequencies of responding needs to be investigated to determine the parameters under which these procedures are effective.
LIST OF REFERENCES


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APPENDIX A

LETTER TO PARENT
Dear Parent:

Reading is an important part of any child's education and a key to general success in academics. One goal of education is to teach effective reading skills that will be crucial to future academic success regardless of the topic being taught. Very simply, reading and understanding, or comprehension, of what one reads are the most basic skill required before success in any area can be achieved. Thus, we, Dr. John O. Cooper, professor of Special Education at Ohio State, and Paul Malanga, a third year doctoral student in the same department, will be conducting a study that will look at how we might help improve comprehension skills with children at your child's school.

Before the study begins, and after parental consent is obtained, Paul Malanga will conduct an assessment to determine if your child would likely benefit from the type of additional assistance provided in this study. During the study, Mr. Malanga will instruct your child in the skill of listening comprehension of text. Thus, your child will listen to a passage and will be asked to tell Mr. Malanga as much as he or she can remember. All student responses will be audiotaped to help with measuring process. The tapes will be stored off the school premises in a locked cabinet. The primary investigators, Dr. John Cooper and Paul Malanga, and two independent observers, Rick Kubina, a doctoral student, and Doug Kostewicz, an MA student, will be the only people with access to the audiotapes. Once the study and data
analysis are completed, the tapes will be erased. This instruction will occur for approximately 15-20 minutes daily, tentatively scheduled to start in March, 1997 and end in May, 1997, at the close of the school year.

Your child and your child's teacher(s) will have an opportunity to comment on their satisfaction with the procedures used in this study following the last day of instruction by means of a questionnaire. Both open ended questions and Likert-type ratings will be used. The items will focus on the usefulness and effectiveness of the instruction.

We are requesting your permission to include your child in this study. Your child's participation is completely voluntary and your consent may be withdrawn at any time without penalty. Please be assured that all information will be kept confidential if you choose to allow your child to participate. Your child's name will not appear in any oral or written reports. If you give permission for your child to participate in this study, please sign the parental consent form attached to this letter and return it to your child's teacher.
If you have any questions regarding this study, please feel free to call Dr. John Cooper at (614) 292-3270 or Mr. Malanga (614) 292-8148. Thank you for your prompt attention to this request. We appreciate the opportunity to work with you and your child.

Sincerely,

John O. Cooper
Faculty Advisor
Assistant
Department of Physical Activities
and Educational Services (PAES)

Paul R. Malanga
Graduate
PAES
CONSENT FOR PARTICIPATION IN
SOCIAL AND BEHAVIORAL RESEARCH

I consent to participating in (or my child's participation in) research entitled:

USING INSTRUCTION AND PRACTICE TO IMPROVE RECALL OF THEMATIC AND TEXT-BASED INFORMATION FROM ORALLY PRESENTED TEXTS

Dr. John O. Cooper or his/her authorized representative (Principal Investigator)

has explained the purpose of the study, the procedures to be followed, and the expected duration of my (my child's) participation. Possible benefits of the study have been described as have alternative procedures, if such procedures are applicable and available.

I acknowledge that I have had the opportunity to obtain additional information regarding the study and that any questions I have raised have been answered to my full satisfaction. Further, I understand that I am (my child is) free to withdraw consent at any time and to discontinue participation in the study without prejudice to me (my child).

Finally, I acknowledge that I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date: ________________________ Signed: ________________________

Signed: ________________________

(Principal Investigator or his/her Authorized Representative)

Signed: ________________________

(Person Authorized to Consent for Participant if required)

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Dear __________,

My name is Paul Malanga and I am a third year doctoral student at The Ohio State University. As part of the requirements of my degree program, I am required to conduct a dissertation research project. I would like to conduct a study at your school investigating how we might help students enhance their comprehension skills. I understand that you may have some children that might benefit from additional instruction in the comprehension of text. Do you believe that one of your teachers and some of the students in their class would be interested in participating in such a study?

Specifically, I would instruct students in the comprehension of text-based material presented aurally for about 15-20 minutes daily beginning in March and continuing until the end of the school year. The students will receive practice in recalling information from a text of their choice. I will also provide instruction in the background information related to the theme of the text and recall data related to background information will be collected. All student recalls will be audiotaped to provide a permanent product for counting correct and incorrect recalls. The tapes will be stored off the school premises in a locked cabinet. The primary investigators, Dr. John Cooper and Paul Malanga, and Rick Kubina, a doctoral student, and Doug Kostewicz, an MA student who will be helping with the study, will be the only people with access to the audiotapes. Once
the study and data analysis are completed, the tapes will be erased. In an attempt to engage the teachers' interest, I will communicate closely with the teacher and share the student's progress throughout the course of the study. This would be beneficial because if positive results are obtained, the teacher may be more likely to incorporate these strategies into their reading instruction.

Please be assured that the student's participation is completely voluntary and their consent may be withdrawn at any time without penalty. Further, if the student chooses to participate, all information will remain confidential. Their name will not appear in any oral or written reports.

A questionnaire will be provided to the participants' and the participants' teacher(s) following the last day of instruction. Both open ended questions and Likert-type ratings will be used. The items will focus on the usefulness and effectiveness of the instruction. The results of the questionnaire will be compiled and reported by the investigator.

If you believe this is something that would interest some of your students, I'll make arrangements to talk with the teacher and students. I will also prepare consent forms to send home to the parents. Thank you for taking time out of your day to consider this proposal. If you have any questions regarding this study, please feel free to call Dr. John Cooper (292-3270) or Mr. Malanga (292-8148).
Sincerely,

John O. Cooper                      Paul R. Malanga
Faculty Advisor                     Graduate Assistant
Department of Physical Activities   PAES
and Educational Services (PAES)     (614) 292-8148
(614) 292-3270
APPENDIX D

AN EXAMPLE OF INFORMATION POINTS
Mario stopped and looked in the shop window. The old Chinese man didn't turn his head, but he looked slyly at the boy out of the corner of his eyes. Slowly he drew the pipe out of his mouth and blew a puff of smoke into the air. "Are you Mr. Fong?" asked Mario.

The man smoothly twisted his head, as if it were on a pivot, and looked at Mario. "I Sai Fong," he answered. His voice sounded as high and dry as a cricket's chirping.

"I would like to buy a cricket cage, if you have any." said Mario.

Sai Fong put the pipe back in his mouth and took a few puffs. His eyes became even narrower than they had been before. "You got clicket?" he asked finally in a voice so soft that Mario could hardly hear it.

"Yes," said Mario. "Here he is." He opened the matchbox. Chester and Sai Fong looked at each other.

"Oh velly good!" said Sai Fong, and a remarkable change came over him. He suddenly became very lively, almost dancing a jig on the sidewalk. "You got clicket! Eee hee hee!" He was laughing delightedly.
**ANSWER SHEET FOR CRICKET IN TIMES SQUARE: PASSAGE**

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<table>
<thead>
<tr>
<th>Name:</th>
<th>Date:</th>
<th>Condition:</th>
</tr>
</thead>
</table>

Text-Based Information Points:

| _mario_ | _crickets_ | _jig_ |
| ______ | ______ | ______ |
| _stopped_ | _chirping_ | _sidewalk_ |
| ______ | ______ | ______ |
| _looked_ | _like_ | _"Eee hee hee"_ |
| ______ | ______ | ______ |
| _shop_ | _buy_ | _laughing_ |
| ______ | ______ | ______ |
| _window_ | _cage_ | _delightedly_ |
| ______ | ______ | ______ |
| _old_ | _have_ | |
| ______ | ______ | ______ |
| _chinese_ | _said_ | |
| ______ | ______ | ______ |
| _man_ | _put_ | |
| ______ | ______ | ______ |
| _turn_ | _back_ | |
| ______ | ______ | ______ |
| _head_ | _took_ | |
| ______ | ______ | ______ |
| _slyly_ | _few_ | |
| ______ | ______ | ______ |
| _boy_ | _became_ | |
| ______ | ______ | ______ |
| _corner_ | _narrower_ | |
| ______ | ______ | ______ |
| _eyes_ | _before_ | |
| ______ | ______ | ______ |
| _slowly_ | _got_ | |
| ______ | ______ | ______ |
| _drew_ | _cricket_ | |
| ______ | ______ | ______ |
| _pipe_ | _finally_ | |
| ______ | ______ | ______ |
| _mouth_ | _soft_ | |
| ______ | ______ | ______ |
| _blew_ | _hardly_ | |
| ______ | ______ | ______ |
| _puff_ | _hear_ | |
| ______ | ______ | ______ |
| _smoke_ | _opened_ | |
| ______ | ______ | ______ |
| _air_ | _matchbox_ | |
| ______ | ______ | ______ |
| _mr. fong_ | _chester_ | |
| ______ | ______ | ______ |
| _asked_ | _velly_ | |
| ______ | ______ | ______ |
| _smoothly_ | _good_ | |
| ______ | ______ | ______ |
| _twisted_ | _remarkable_ | |
| ______ | ______ | ______ |
| _pivot_ | _change_ | |
| ______ | ______ | ______ |
| _"i sai fong"_ | _came_ | |
| ______ | ______ | ______ |
| _answered_ | _suddenly_ | |
| ______ | ______ | ______ |
| _voice_ | _became_ | |
| ______ | ______ | ______ |
| _sounded_ | _very_ | |
| ______ | ______ | ______ |
| _high_ | _lively_ | |
| ______ | ______ | ______ |
| _dry_ | _dancing_ | |
| ______ | ______ | ______ |

Correct Recalls ___  Incorrect Recalls ___  Thematic Recalls ___

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CRICKET: PASSAGE 44 (PAGE 2)

Thematic Information Points:

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<tr>
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</tr>
<tr>
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</tr>
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</tr>
<tr>
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</tr>
<tr>
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<td>forelegs</td>
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<tr>
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</table>

Correct Recalls  ____  Incorrect Recalls  ____  Text-Based Recalls  ____

Comments:                                                                                   

                                                                                           
                                                                                           

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APPENDIX E

ORAL SCRIPTS TO TEACHER AND STUDENTS
SCRIPT TO TEACHER

My name is Paul Malanga and I am a third year doctoral student at The Ohio State University. I will be conducting a study at your school investigating how we might help students enhance their comprehension skills. I understand that you may have some children that might benefit from additional instruction in the comprehension of text. If so, I would instruct students in the comprehension of text-based material presented aurally for about 15-20 minutes daily beginning in March and continuing until the end of the school year. I will provide the students practice in recalling information from a text of their choice and will provide instruction in the background information related to the theme of the text. Since my primary interest is what the student says, all student responses will be audiotaped so I can listen to them later and evaluate their accomplishments. The tapes will be stored off the school premises in a locked cabinet. The primary investigators, Dr. John Cooper and Paul Malanga, and two Ohio State graduate students, Rick Kubina, a doctoral student and Doug Kostewicz, an MA student, will be the only people with access to the audiotapes. Once the study and data analysis are completed, the tapes will be erased. I will communicate closely with you and share your student's progress throughout the course of the study. Keeping you informed as to the instructional method and progress of your student will help you understand exactly what I am doing. Your students participation is completely voluntary and their
consent may be withdrawn at any time without penalty. Please be assured that all information will be confidential. Student names will not appear in any oral or written reports. You will have an opportunity to comment on the progress of your students with a questionnaire following the last day of instruction. Both open ended questions and Likert-type ratings will be used. Your responses to this questionnaire will provide information regarding your perceived usefulness of my procedures. The items will focus on the usefulness and effectiveness of the instruction.

If you believe your students may benefit from this instruction, I'll make arrangements to talk with the students. I will also prepare consent forms to send home to the parents. Thank you for taking time out of your busy day to talk with me this afternoon.
SCRIPT TO STUDENT

My name is Paul Malanga and I am a student at Ohio State. I will be doing a study at your school seeing how we might help students improve their ability to understand what they read. Your teacher said you might like some extra help with reading. If you would like this, I would teach you every morning for about 15-20 minutes each day beginning in March and continuing until the end of the school year. We would practice recalling information from a text of your choice that you would listen to. I would also teach you background information related to the topic of the book. I will be talking with your teacher and sharing your progress throughout the course of the study. Your participation is completely voluntary and you can withdraw at any time without penalty. All information will be kept confidential if you choose to participate. If you think this is something that you would be interested in doing, talk with your parents about it and I'll send a permission slip home with you. Please read it carefully with your parents and sign it. Thanks for talking with me today. I look forward to working with you.
APPENDIX F

BACKGROUND INFORMATION SHEET
<table>
<thead>
<tr>
<th>Words</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
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<td>grasshoppers</td>
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<td>chirp</td>
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<td>use</td>
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<tr>
<td>wings</td>
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<td></td>
</tr>
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</tr>
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<td>dense</td>
<td></td>
</tr>
<tr>
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APPENDIX G

INSTRUCTIONAL DURATION DATA SHEET
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Practice Duration Data Sheet

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Comments: 

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APPENDIX I

PROCEDURAL CHECKLISTS
**Procedural Integrity Checklist**

Student's Name: _____________  
Session#: _____  
Date: ___/___/___  
Observer: _________

**Prebaseline Instruction**

Experimenter says, "I am going to play a passage for you and then ask you to tell me as many facts and points as you can remember. Then I will ask you to tell me anything else you want related to the topic of the passage you just heard. But first, I will play a practice passage and show you what I mean."

<table>
<thead>
<tr>
<th>Activity</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimenter plays passage</td>
<td></td>
<td></td>
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<tr>
<td>Experimenter demonstrates text-based recalls</td>
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<td></td>
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<tr>
<td>Experimenter demonstrates thematic recalls</td>
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<td></td>
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<tr>
<td>Experimenter plays passage for participant</td>
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</tbody>
</table>

Experimenter says, "Tell me all the facts and points you can remember from the passage you just heard. Ready, begin."

<table>
<thead>
<tr>
<th>Activity</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listening Only</td>
<td></td>
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<tr>
<td>Experimenter reads passage</td>
<td></td>
<td></td>
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<tr>
<td>Experimenter starts recorder</td>
<td></td>
<td></td>
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<tr>
<td>Experimenter states the date</td>
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</tbody>
</table>
Experimenter says "When I say begin, tell me all the facts and points you can remember from the passage you just heard. Ready, begin."

Yes No

Experimenter says, "Now, in one minute, tell me anything else you want related to (states topic). Ready, begin."

Yes No

Experimenter praises participant's efforts

Yes No

**Instruction and Listening**

Experimenter begins timer

Yes No

Experimenter discusses information points on the Background Information Sheet

Yes No

Experimenter stops timer and records amount of instructional time on instructional duration data sheet

Yes No

**Practice and Listening**

Experimenter hands out Background Information Sheet

Yes No

Experimenter starts the recorder

Yes No

Experimenter states the date

Yes No

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Experimenter instructs the participant to read as many points as they can in a minute repeating the list as often as they can.

Experimenter begins timer

When the timer beeps, the experimenter says, "Good, let's continue from where you stopped."

This timing procedure is repeated up to the amount of time equivalent to instruction.

1-Minute Timing
Experimenter reads passage
Experimenter starts recorder
Experimenter states the date
Experimenter says "When I say begin, tell me all the facts and points you can remember from the passage. Ready, begin."
Experimenter says, "Now, in one minute, tell me as much as you know about the topic discussed in the passage. You can say anything you want related to (states topic). Ready, begin."
Experimenter praises participant's efforts
Generality Passage

Experimenter says "When I say begin, read as much as you can in this passage starting here (experimenter points to the first word in generality passage). Ready, begin."

Experimenter begins one minute timing

Experimenter repeats one minute timing on generality passage

Experimenter presses record on tape recorder

Experimenter states date and generality passage number and begins one minute timing by stating, "Ready, begin."

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APPENDIX J

TEACHER/STUDENT CONSUMER SATISFACTION
TEACHER EXIT INTERVIEW

1a. Were the procedures used in this study feasible to use in your classroom?

1b. If not, what changes would need to be made to make it a more practical classroom procedure?

2. Is it likely that you would use this procedure in your classroom as a compensatory form of instruction?

Please circle the response that best describes your reaction to this study.

1. I believe my student(s) learned something useful by participating in this study.
   a) Definitely    b) Probably    c) Maybe    d) Probably not
STUDENT EXIT INTERVIEW

1. What did you like best about this study?

2. What you liked least about this study?

3. If you could change any part of this study, what would you change?

4. Do you believe that what you learned in this study will help you in school in the future? Why or why not?

Please circle the response that best describes your reaction to this study.

5. I would participate in this study again.
   a) Definitely  b) Probably  c) I'd think about it  d) No

6. I learned something useful from my participation in this study.
   a) Definitely  b) Probably  c) I don't think so  d) No