The Effects of Inference Inducing or Detail

Questions on Preliterate Children's

Story Comprehension

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ABSTRACT

THE EFFECTS OF INFERENCE INDUCING OR DETAIL QUESTIONS ON
PRELITERATE CHILDREN'S STORY COMPREHENSION

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This study investigated preliterate children's story schemas by manipulating
questions during story presentation. Approximately equal numbers of males and
females of Preschool children and Kindergarten children participated. Children were
assigned to one of three story presentation conditions, inference inducing questions
(IIQ), detail questions (DQ) and a no-question (NQ) control. Retention of the story's
gist and detail was measured immediately after story presentation and one week later.
Results indicated that Kindergarteners performed better than Preschoolers. Such
developmental differences were greatest on the delayed comprehension test. Some
evidence was found for an effect of story presentation when correlations between
detail test performance and comprehension test performance for the IIQ and DQ
conditions were compared to the same correlation for the NQ condtion. For
Kindergarteners, the DQ condition correlations were lower than those for the NQ
condition. In contrast, the correlations between comprehension and detail test
performance among Preschoolers were lowest in the IIQ condition. In addition,
responses to questions in the DQ condition predicted performance on the detail tests

performance for the IIQ and DQ conditions were compared to the same correlation for the NQ condtion. Results indicated developmental differences. For Kindergarteners on the immediate test, the DQ condition correlations decrease significantly from the NQ condition. In contrast, the IIQ condition correlations appeared decreased more from the NQ condition correlations than the DQ conditions, although not significantly. Implications are discussed in terms of the developmental differences in preliterate children's story schema facilitation and story comprehension. Suggestions for future studies include a within-subjects design for story presentation and more story presentation questions.

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CHAPTER I

INTRODUCTION

The focus of this thesis was on children's comprehension of stories. One fundamental assumption of comprehension is that spoken or written text does not have meaning in and of itself (Adams & Collins, 1985). The comprehension process has many facets, but the one this study particularly focused on was how children form a clear and cohesive understanding of a story's structure, called a macrostructure. It has been proposed that comprehension involves two sources of activation, bottom-up processing and top-down processing. Bottom-up processing means that comprehension flows from the print on the page, such as letter and word decoding, to overall interpretation. This process is also called "data-driven" (Bobrow & Norman, 1975). On the other hand, top-down processing flows in the opposite direction with the reader organizing the story according to a mental structure, forming hypotheses about the story, and then looking for information to confirm them (Bobrow & Norman, 1975). This process in also called "conceptually driven" (Bobrow & Norman, 1975). The present study approached comprehension as a top-down process. This study examined the semantic aspect of comprehension because it has been shown that subjects often do not recall or recognize the particular syntactic information of a sentence, but they can accurately remember the semantic content (Bransford et al., 1972; Bransford & Franks,

1971; Nezworski, Stein, & Trabasso, 1982; Paris & Carter, 1973; Sachs, 1967).

Agreeing with Walter Kintsch, "reading comprehension depends not only on the local properties of the text and the reader's decoding activities at the sentence and paragraph level, but also on the overall, between-paragraph organization of the text" (Kintsch, 1987, p.7). This between-paragraph approach to text comprehension has lead to a focus on the role of knowledge structures in the development of children's reading comprehension. These knowledge structures are schemas for how a story should be organized (e.g., Bower, Black, & Turner, 1979; Johnson & Mandler, 1980; Stein & Glenn, 1979). The present study investigated preliterate children's story schema and its effects upon comprehension and retention. It is at this age that children are beginning read to and are therefore in the beginning stages of developing their story schema.

<center>Macrostructure</center>

There are many definitions of a schema, but most researchers maintain that a schema is a theory about knowledge. It determines how knowledge is represented and how that representation facilitates use of knowledge, how it is encoded and retrieved (Rumelhart, 1975). More specifically, in two different papers Anderson states that a schema "indicates the typical relations among its [the text's] components" (1978, p.68) and that it is "organized knowledge of the world" (1985, p. 372). According to Anderson (1985), a schema has six basic functions: 1) to provide ideational scaffolding for assimilating text information, 2) to facilitate selective allocation of attention, 3) to enable inferential elaboration, 4) to allow orderly searches of memory,

5) to facilitate editing and summarizing, and 6) to permit inferential reconstruction. The present study investigated developmental differences in preschool children's use of story schemas and whether the use of such schemas can be facilitated by asking different types of questions at crucial points in the story's episodes. This facilitation was measured by the children's ability to make correct inferences at time of test. Therefore, the current study focused upon the first and third functions of a schema.

The role of ideational scaffolding in schema use is that it provides a niche or slot in the schema for certain text information (Adams & Collins, 1985; Anderson, 1985). Because this study investigated children's comprehension of stories, how the schema provides for this scaffolding will be explained in terms of a story schema instead of other schemas, such as a narrative schema. Stories are more complex than narratives because the latter do not have the elements or the structure which stories have. For example, a narrative may be of a vacation. A person describing a vacation may tell the order of events differently than they actually happened in order to embellish the narrative. The narrative is less structured and has fewer required elements than story schemas. The basic necessary elements of a story schema are characters (real or imaginary) acting in a specific place and time (the setting). Then, an unexpected event occurs (a conflict or complication) that requires an adjustment or change in the character which could be a change in mental state or in the situation. Finally, a resolution occurs when the complication is solved.

The focus of the present study was the developmental differences in the use of story schemas. Researchers operationalize the story schema in terms of a story

grammar. A story schema reflects the regular structures (basic elements) of a story whereas story grammars aim to identify what those regularities are (Mandler, 1984). In other words, a story schema is "the overall structure of a narrative" (Pearson & Campbell, 1985, p. 330). On the other hand, story grammars provide the means by which researchers investigate and explore story schemas (Mandler & Johnson, 1977; Stein & Glenn, 1979; Thorndyke, 1977). There is some debate about what the actual story grammar should be, but for the purpose of this study, Mandler & Johnson's (1977), model was adopted. Mandler and Johnson (1977) represent and organize a story according to these or parts: story => setting + beginning + development + ending. (Mandler & Johnson, 1977). In other words, a story schema has a "niche or slot" for a setting, a beginning, etc., that are expected to be filled as the story unfolds. For example, the "setting" slot is filled when the story reveals who the main character is and where the story takes place. The hierarchical pattern of the organization of a story schema continues until each idea unit within each sentence within each episode is broken down and organized (Pearson & Campbell, 1985; Rumelhart & Orton, 1977). This hierarchical organization of stories can be represented as a tree which makes explicit both the structure and the relationship between the constituents.

Mandler & Johnson (1977) propose that there are two major constituents of stories, a Setting and an Event Structure. The Setting introduces the protagonist, location and time in which the story takes place. The Event Structure, which is connected to the Setting temporally, is organized into three episodes which are causally connected; a Beginning, a Development, and an Ending. The crucial aspect

of the Beginning is that it causes the protagonist to respond in some way which in turn forms the Development. The Development is the most elaborated part of the Event Structure. At this point the protagonist has a reaction to an event given in the Beginning. This reaction begins the Development. The Reaction of the protagonist can be one of two reactions, a Simple Reaction or a Complex Reaction. The Simple Reaction is a psychological reaction, usually an emotion, and is followed by an action. In contrast, the Complex Reaction consists of a Simple Reaction which causes a goal. In order to reach the goal, a Goal Path is developed. The Goal Path is a behavioral attempt to solve the problem or reach the goal. This Attempt can either be successful and lead to an outcome or unsuccessful and lead to another Attempt. The third episode of the Event Structure is the Ending. The Ending is the close of the story and tends to be "connected to the Development as a whole rather than to the immediately preceding event. Ending may refer back to the Beginning, the protagonist's Reaction or the Attempt" (p. 123). To illustrate this story grammar more concretely, the stories A Boy, A Dog, And A Frog and Whiskers' Adventure was analyzed. Refer to Appendix B for the hierarchical structure and Appendix A for the written story.

One outcome of the overall story schema is children's internalization of the structure "through constant exposure to stories of various degrees of well-formedness" (Pearson & Campbell, 1985, p. 331). In other words, schemas are continually in transition, "restructuring" and "blending" the new information from the text or story (Spiro, 1977). The importance of having this knowledge structure is shown in studies

which investigate that violation of story structure leads to decreased comprehension (Mandler & Johnson, 1977; Stein & Nezworski, 1978; Thorndyke, 1977; Kintsch, Mandel, & Kozminsky, 1977). For example, Kintsch, Mandel, & Kozminsky (1977) found that children gave inferior summaries of scrambled stories, but if they were given unlimited time to read these scrambled stories, their summaries showed that they (the children) were trying to "make sense" of the story. When structure wasn't inherent in the story, they imposed a structure, although it was not completely coherent.

This hierarchical organization of the story suggests that if the child has a story schema, reading and comprehension should require minimal effort because all that is necessary is filling in the slots which are already organized by the schema. However, a functional schema also requires background knowledge both about story structure and about the topic of the particular story. Comprehension is an "interaction between the characteristics of the message and the reader's existing knowledge and analysis of context" (Anderson, 1978, p.72). Fagan (1987) showed that illiterate adults, after orally reading stories and then recalling them, were more sensitive to key concepts in the story and to their importance for recall than second grade children resulting in more effective recall. Thus the processing behavior of illiterate adults tended to result in more effective reading than low ability grade two readers. In other words, illiterate adults had more effective reading practices than regular second graders. One explanation is that the amount and kind of background knowledge that a person possesses greatly interacts and affects the reading process, which explains why the

adult illiterates performed better than regular second grade readers. The relationship between background knowledge and comprehension is also shown in inference generation.

According to Beach & Brown (1987) making an inference is showing the "ability to use their knowledge--their 'knowing-how' competence, rather than their 'knowing-that' knowledge of conventions" (p. 159). They go on to explain that readers acquire this "knowing-how" competence from reading and responding to literature, concluding that older or more experienced readers bring more fully developed conventional knowledge ("knowing-that") to a text or story and therefore can make better and more successful inferences. However, it is the "knowing-how" competence that enables readers to make inferences about the structure in which the story was written. Svensson (1985 as sighted in Beach & Brown, 1987) found a steady developmental increase in the ability to infer, but he also found that the more amount of previous reading of and instruction in literature subjects had, the deeper the level of interpretation of the story. The role of inference generation on comprehension has been the subject of many studies (e.g., Ackerman, 1988; Ackerman & McGraw, 1991; Beach & Brown, 1987; Graesser, Haberlandt, & Koizumi, 1987; Kintsch, 1987; Paris & Lindauer, 1977; Singer & Ferriera, 1983).

Kintsch (1992) explains further that causal inferences are necessary to forming a higher-order macrostructure (story schema) of the story. He compares this macrostructure to a representation of the situation by integrating the text and one's previous knowledge which he called a situation model. These situation models can be

weak or strong. A weak situation model occurs when a person lacks the precise knowledge needed or is not able or willing to get enough information from the text in order to completely understand it. For example, members of one culture might not fully understand a story from a different culture because of a lack of knowledge about the other culture's goals and reactions in various situations. A strong situation model, on the other hand, occurs when a person has rich knowledge and is able and willing to get information from the text for complete comprehension. For example, a child who has abundant knowledge about moving because the father is in the Air Force, can readily, quickly, and fully understand a story about a child who has to move to a new city. Kintsch makes the point that a weak situation model, which is often accompanied by knowledge of syntax, is sufficient if the purpose is to simply recall. However, it is not sufficient for complete comprehension, deep analysis, and the ability to generate inferences from the text. Making inferences is necessary to create a macrostructure and, therefore, to fully comprehend the story, suggesting that a strong situation model is a more productive and efficient aide for full comprehension of a story. Singer and Ferriera (1983) support the necessity of inferences for comprehension because "causal links underlying text meaning are frequently implicit; and that, therefore, causal inferences are essential to ensure comprehension" (p. 437). These findings suggest that background knowledge about the structure of a story (story schema) is necessary to make inferences about information in the story. Beach and Brown (1987) also support the theory that knowledge of story schema is crucial to inference making. The category titles which they use for their three-part theory

indicate the importance of previous knowledge on comprehension: (1) principles guiding co-operative goal-directed behavior, (2) rules of syntax, semantics, and phonology, and (3) mutual knowledge such as factual knowledge, conventional knowledge, and knowledge of law-like regularities.

Additional research (e.g., Anderson, Reynolds, Schallert & Goetz, 1977; Chi, 1978; Shallert, 1976; Spiro, 1977) has shown that a strongly developed schema enables younger children to perform more like older children both in comprehension and inference generation. In addition, world knowledge of the story's topic also improves comprehension (e.g., Gagne, Bell, Weidemann, & Yarbourgh, 1980; Langer, 1984). For example, Gagne, Bell, Weidemann, & Yarbourgh (1980, as sighted in Langer, 1984) found that recall of more familiar passages were learned faster and better recalled than less familiar passages. They concluded that more extensive knowledge allows readers to elaborate content on their own. These findings indicate not only the role of story schema use on comprehension, but the necessity of background or world knowledge on comprehension. Better comprehension allows for more appropriate inference generation and that inference generation, in turn, improves the story schema by appropriately using the information in the story and the relationship between idea units in the story. The improved story schema then increases background knowledge, both on the story's topic and use of one's story schema, and the cycle begins again. For example, one child has lost her favorite blanket in the past and therefore has this background knowledge of what happens when you lose something important. The second child has never lost anything important. Then both children read a story about

a boy who loses his dog. The child with the background knowledge of losing a blanket understands the story better because of the previous knowledge than the child who has never had the experience of losing something important. However, reading the story gives the 'no-background' child the knowledge of losing something and reinforces the schema of the child who already had the background knowledge. Therefore the relationship between story schema, background knowledge, and inference generation is quite dynamic.

Another definitive aspect of inferences is the distinction between bridging inferences and elaborative inferences also called backward and forward inferences, respectively (e.g., Graesser, Haberlandt, & Koizumi, 1987; Singer & Ferriera, 1983). A bridging inference establishes a conceptual connection between an explicit statement and information previously stated in the text. An elaborative inference, on the other hand, is used to embellish the story, but does not make any conceptual connection. To clarify the distinction between these two types of inferences, consider Graesser, Haberlandt, and Koizumi's (1987) examples and explanation:

Consider the following two explicit statements:

"1. The dragon dragged off the daughters.
 2. The daughters cried.
These two statements are not directly related; dragging someone off does not automatically result in the person crying. The following bridging inferences would probably be generated in order to conceptually connect the explicit nodes 1 and 2:
 3. The daughters thought the dragon would do something bad to them.
 4. The daughters were frightened.
 5. The daughters wanted someone to help them. ·
Listed next are some elaborative inferences which readers might generate but are not needed for establishing conceptual

connection between nodes 1 and 2.
>   6. Tears ran down the daughters's eyes.
>   7. The dragon used his claws (when dragging the
daughters off).
>   8. Some heroes killed the dragon (an expectation about
the subsequent plot).
The bridging inferences 'fill the gaps' between explicit
propositions, whereas the elaborative inferences 'radiate from' the
bridges and explicit nodes" (p. 219).

The present study focused on children's ability to make bridging inferences

since these are the inferences most needed for full comprehension of a story and

because they are formed during story presentation (Bloom, Fletcher, Van den Broek,

Reitz, & Shapiro, 1990; Clark, 1977; Singer & Ferriera, 1983; Trabasso, Secco, & Van

den Broek, 1984; Van Dijk & Kintsch, 1983).

Comprehension

Before going further, a more direct definition of comprehension is necessary.

Comprehension is more than just understanding or recall of the explicitly stated

information within a story. Full comprehension means the reader can make inferences

about the implicit information in a story. As is evident from the past discussion on

ideational scaffolding, the story schema guides readers in the construction of a mental

representation; it is a theory of how comprehension occurs. Take for example, the

sentence in the story Whiskers' Adventure, "Seeing that it was Whiskers, Michael

smiled and gave his puppy a big hug." The importance and relevance of this sentence

is not obtained if read outside the context of the story and a story schema. Here, it

appears that Michael was happy to see his dog, but this sentence is crucial to the

ending or resolution. Not only is Michael happy, he is excited and relieved because

he thought Whiskers was lost, never to return. In addition, the quality of inference that can be generated from this sentence is better when a reader is implementing a story schema. The schema gives the sentence more relevance and importance because it "fits" into a specific slot in the schema; the ending. This does not occur when reading the sentence in isolation from the story, and therefore not using one's story schema. The reader can organize the events in a story according to their schema and because of this hierarchical organization, the reader can make inferences and recall relevant information. As previously discussed, the relationship between story schema and inference generation is interactive with both processes influencing the other. Take for example, when readers encounter a part of a story which is unfamiliar or doesn't fit their present schema (no slot is available, yet the information is crucial to the story). Because the schema is incomplete or inadequate, they struggle to comprehend it and make sense of its place and function in the story by generating inferences. Through this process (comprehension) the story schema is expanded to include this new part of a story and the schema is, therefore, improved because it becomes more functional.

Inference Generation

Cognitive constructs such as story schemas allow researchers to empirically investigate children's comprehension of stories and to examine differences in the comprehension processes of skilled and less skilled readers (e.g., Kintsch, Mandel, & Kozminsky, 1977; Hinchley & Levy, 1988; Fagan, 1987; Montague, et.al., 1990; Palincsar, 1991; & Bellezza, 1988). Studies conducted in the 1970's (e.g., Brown, 1975; Brown & Murphy, 1975; Paris & Carter, 1973; and Paris & Upton, 1976) laid

the ground work for investigating the presence of story schemas in young children, how they are utilized, how they develop, and how they affect comprehension. Past research has shown that children do follow and impose structure when reading a story which enables them to make inferences about implicit information in the text. These inferences, in turn, improve comprehension of the story because they aid in the organization of the information in the story into a schema. For example, Paris and Upton's (1976) findings showed that for Kindergarten children, the best predictor of overall memory for the story ideas was the child's ability to comprehend and remember implied relationships among sentences regarding the beginning and end point of an episode. Although looking at adults, Spiro's (1977) findings are relevant to the present study, because they showed the importance and strength of inference generation on comprehension. Subjects read a short story about an engaged couple's problem before they were told a resolution which either confirmed the premises given (a balanced story), or contradicted them (an imbalanced story). Afterwards, subjects were tested for recall. It was found that subjects who read the imbalanced story modified the story to reconcile the incongruity and even rated high confidence in their modification six weeks later. In other words, subjects were more apt to remember the inferences they generated to make the premises and resolution congruent than the actual story information given.

These past studies focused on inference generation at the time of test, after the story presentation. However, Singer & Donlan (1985) stated that "previous research has shown that the questioning process is an effective way of interacting with and

learning from text (Anderson & Biddle, 1975 as sighted in Singer & Donlan, 1985), particularly if there is coherence among the questions posed, the structure and content of the text, and the goal or assessment of learning (Rothkopf, 1982)" (p.478). Although Singer and Donlan (1985) were examining a self-questioning strategy by adolescents in the eleventh grade, the implications remain the same. Asking inference-inducing questions might aid comprehension, and more importantly, story schema facilitation. The present study utilized Singer and Donlan's (1985) method by asking different types of questions during the story.

Studies by Ackerman (1988; 1991) investigated the role of "clues" in the story on the ability to make reason inferences, inferences concerned with the reason for the inconsistent outcome given in the story. Ackerman (1988) developmentally investigated the ability to resolve inconsistencies between premise and outcome information between first grade and fourth grade children and adults. Experiment 1 had three main findings. First of all, children tended to resolve the inconsistency by making an inference which disavowed the character's intent and rejected the premise. Secondly, inference generation overall increased with age. Finally, all groups made more inferences for stories that gave two clues in how to resolve the inconsistency than stories with no clues. These findings not only show the improvement of inference generation with age, but that young children's inference generation can be facilitated. The relevant finding of Experiment 2 to the present study corresponds to the third finding in Experiment 1; the number of reason inferences made by subjects varied with the number of clues and that this effect was greater among children than

adults. This suggests that clues help children who are in the process of learning the story structure, but not adults who (probably) already have a very functional and appropriate story schema.

By adding a title to each story, Experiment 3 was conducted to gain insight into how children use clue information and why children may be more dependent on clue information than adults. The results showed that titles were associated with an increase in the number of reason inferences, especially for children. Ackerman suggests that the "titles seemed to provide something that the children lacked, and this lack may contribute to developmental differences in making particular inferences" (p. 1437). One explanation of these results is that the titles simply increased the availability of the key concepts necessary for making the reason inferences. If titles affect the prominence of a concept in the internal story schema, then the results suggest that children organized the stories as they unfolded and consulted a representation as a whole when they answered the questions. In other words, the children used their story schema to organize the story and, if this schema is not developed enough, then inference generations occur less often among younger children than older children with more developed schemas. The titles aided the development of the children's story schema as they were reading the story.

Yuill and Joscelyne (1988) also found that integrative titles increased inference generation. Using children 7 to 8 years of age who were either good or poor readers, they examined the effect of organizational cues (titles and/or pictures) and found that stories with integrative titles were understood better than those with non-integrative

titles for poor readers, but had no effect on good readers. They also trained half of both good and poor readers to look for "'clue words' to infer main story consequences [which were] implicit in the story" (p. 152). The results showed that training helped poor readers but, consistent with Ackerman's (1988) study, good readers were not effected.

Experiment 4 (Ackerman, 1988) investigated inference modification, changing one's answer to an inference question (previously asked) after additional information is given. Subjects were asked an inference question after the outcome, but before the resolution of the story. The relevant finding pertains to the responses of the first graders. They showed no sensitivity to the resolution information. In other words, they did not change their answer from the first inference question (after the outcome) to the second inference question (after complete story presentation). It appears that first graders will "weigh information in a sensitive manner prior to generating an interpretation (shown in Experiment two) but will not modify an inference interpretation once it is generated, even in response to information that directly disconfirms or contradicts the information" (p.1440).

Ackerman & McGraw (1991) further investigated the results of Ackerman's (1988) Experiment 3 results and their implications. They investigated what constrains children's causal inferences about an unexpected event in a story. For one of their variables, they examined encoding factors that provide this constraint. The encoding factors were the "presence or absence of clues about the role of the object concept in the outcome" (p. 364). They used stories that contained an early goal sentence paired

with an inconsistent outcome. They suggest that encoding variables which affect concept accessibility may constrain causal inferences because prior mention of a concept in a story enhances the inferential use of that same and related concepts later. For example, a blue ball is mentioned repeatedly in a story. The concept of a ball is more apt to be accessed during inference generation or time of test than, for example a block, which is not mentioned frequently in the story. In other words, "concept accessibility constrains a causal inference by providing the vocabulary and focus for the inference" (p. 390). The results of Experiment 1 showed that second and fifth graders made fewer object inferences (an inference made about a specific object mentioned in the story) than did college students, and the differences were especially large for the stories that gave no clues about the object. These results support their hypothesis that concept accessibility, clues given in the story, help children to make inferences.

Story Presentation

However, it is important to note that these authors are asking for an inference that resolves a premise/outcome inconsistency, whereas in the present study, children were asked to make an inference about implicit information given in the story which contains no inconsistencies. A question raised by these findings is whether questions asked at a crucial point in the story also aide the development of a story schema. Suppose for example, a question asked at the end of the setting requires that the information in the setting be integrated in order to answer correctly. It was expected that this type of question will facilitate the schema and the organization of the setting,

and therefore, improve their story schema. On the other hand, a question which asks about details in the setting, also presented at the end of the setting, may not facilitate the organization of the story's setting. This detail question focuses on a specific thing or small bit of information in the story, not the overall structure. The research suggests that the integrative question may be more helpful. Ackerman & McGraw (1991) used stories with no clues, stories with two clues, and stories with an implicitly stated clue (called a no-mention clue). They found that children made more inferences in the 'no mention clue' condition than the no clue condition suggesting that even the implication of the object in the no mention condition was sufficient to activate the object concept. This activation, in turn, improved subjects' ability to answer inference questions, which were asked at the end of the story. Presumably, the implicitly given clues improved the children's story schema.

Because few researchers have examined the effect of asking different types of questions during story presentation, this study investigated preschool children's story comprehension and their development and improvement of a functional story schema. The present study not only investigated the effects of asking questions during story presentation, but investigated the effects of asking different types of questions. An inference generation question which requires that the child make an inference from the explicit information in the story was compared to a detail question for which the child has to recall a specific detail given in the story. These two question types were also compared to a no question condition where no questions were asked during the story. In developmental research which finds that younger children perform worse than older

children on a cognitive task, there remains the question of "why?". Is it because younger children lack the cognitive ability or process that the task requires (a mediational deficiency) or because the younger children have the ability, but fail in their application of that ability? As will later be discussed, research has shown that children as young as four years do possess, at least, a primitive story schema. By asking questions during the story presentation, the present study investigated young children's use of story schema and a method that might enhance its use. Questions which prompt an inference may affect schema development by helping the reader reconstruct the previous episode read to them or increase sensitivity to subsequent episodes. An example of this type of question, based on the story A Boy, A Dog, and A Frog, is: "Why did Peter and Rags run down the hill as fast as they could?" In contrast, questions which do not prompt an inference may not aid the reader in the construction of an improved story schema. An example of this type of question is: "When Peter and Rags ran down the hill as fast as they could, what did Peter and Rags trip over?"

Developmental Differences

Since it has been shown that background knowledge interacts with the comprehension of stories, it leads one to ask how knowledge about the world interacts with the development of story schemas. Past research has investigated this issue by measuring comprehension and inference generation across age and reading ability. One study by Paris and Lindauer (1976) who used six and ten year old children suggests that the ability to infer relationships about sentences increases with age along

with the ability to use implicit and indirect retrieval cues.

Most of the research investigating this issue has focused on educational issues such as comparing differences between normal children and children with learning disabilities (e.g., Hinchley & Levy, 1988; Levy & Hinchley, 1990; Montague, et al, 1990), developmental predictors of comprehension (eg., Mason, 1992; Saarnio, et al., 1990), and variables which affect reading (eg., Denner, et al., 1989; Mayer, 1987; Yuill & Joscelyne, 1988). For example, Hinchley and Levy (1988) investigated developmental and individual differences in reading comprehension for third to sixth graders. One of their results showed that high-skill readers answered the same number of questions correctly whether they read orally, silently, or listened, but the low-skill and normal readers answered significantly more questions correctly when reading orally than silently or listening. Although not mentioned by the authors, it appears that the better performance of high skill readers despite story presentation mode may be due to high-skill readers possessing a more well-developed story schema than low-skill readers. Possibly this more developed story schema enabled fuller comprehension of the story despite the presentation mode. It appears that reading ability (prior experience with stories and their structure) is affected by the functional level of one's story schema. Because low-skill readers performed better after reading orally, the authors concluded that comprehension was not dependent "only on word-decoding skills", but on some other aspect of the comprehension/reading schema such as previous knowledge of how a story is organized and how the parts of the story relate, hence a story schema (p.17). This finding is relevant to the present study which

investigated preliterate children, who do not have word-decoding skills yet, and their comprehension of stories.

This finding that comprehension was not dependent on word-decoding skills, but that it requires a schema, may be more compelling if pre-literate children's comprehension ability is investigated. Interestingly, very little research has been conducted using preliterate children. Therefore, it is important to review the few findings to understand at what level of schema development these children are likely to utilize.

Only one study has shown that preliterate children do, in fact, possess at least a primitive story schema and have the ability to infer (Poulson, Kintsch, and Kintsch, & Premack, 1979). Four and six years old children were shown and asked to describe pictures of two stories, one at a time. One story's pictures were shown "in order" and the other story's pictures were shown in random or scrambled order. Children were then asked to retell the story without using the pictures. The results showed that when the story was presented in normal order, children recalled more core propositions (important to the story) than spurious ones (unimportant to the story). Four year old children were more apt to simply describe the picture when it was presented in a scrambled order than in the normal condition. In contrast, their descriptions were "better, more adult-like, more true to the pictures" when the story was presented in the normal condition (p. 398). The six year old children performed better than the younger children, especially in the number of story propositions (making connections between pictures) in their descriptions while the story was being presented. The older

children were more able to "make sense" of the scrambled stories using a story schema than the younger children. These findings not only indicate that preliterate children have and use a story schema to organize their descriptions of stories and when retelling a story, but that there are developmental differences between older and younger preliterate children.

Another paper by Mason (1992) focused on the connection between reading stories to these children and their subsequent reading achievement. In reviewing past studies, Mason (1992) concludes that children do learn about written language from being read to because well-read-to children develop a "book language" way of talking (p. 216). Mason never explicitly states it, but it appears that this "book language" may come from the knowledge and use of a story schema gained from being read to. Therefore, based on this research, it appears that despite preliterate children having less background knowledge (by virtue of having had fewer experiences) to aid comprehension and schema development, they do possess and use a story schema even though it may be primitive.

Other studies investigating differences in story comprehension have focused on differences between normal and learning disabled students and differences between illiterate adults and "normal" readers (e.g., Fagan, 1987; Montague, Maddox, & Dereshiwsky, 1990). Montague, Maddox, and Dereshiwsky (1990) investigate story comprehension and production of three age groups of normal and learning disabled students. Each subject completed two tasks. The first task was reading along with a tape-recorded story which was structured according to story grammar research.

Afterward the children retold the story and answered comprehension questions. The second task, which is a production task, required children to create their own story from a one sentence prompt given to them. Overall there were no significant developmental differences on either task. However, on both tasks students with a learning disability (LD) recalled fewer total units and fewer internal responses of characters than students with no disability (NLD). Montague, Maddox, and Dereshiwsky, (1990) propose that the difference between LD and NLD students for the production task, according to episodic structure, is due to students with LD writing incohesive, unorganized, and incomplete stories. In other words, low-skill and learning disabled children seem to be just as able to decode words. However, their macrostructure for stories is deficient or not fully developed or is not utilized to the same extent in the creation of stories. Anderson (1978) suggests that young readers, and possibly students with LD, have a "partially formed schema sufficient for some level of understanding of the material, but will not enable a representation of great depth or breadth" (p. 79). Another possible explanation which the authors do not consider is the role of prior knowledge. Students with LD may have a less knowledge about many topics because of less exposure due to their disability. Therefore because of this lack of knowledge, the story schema is less likely to be activated and utilized. This is evidenced in referring back to Fagan (1987) who showed that adults in a literacy class, after orally reading stories and then recalling them, were more sensitive to key concepts in a passage and to their importance for recall than second graders resulting in more effective recall. Thus the processing behavior of illiterate adults

tended to result in more effective reading than that of the low ability second grade readers. In other words, illiterate adults had more effective reading practices than regular second graders. Researchers have concluded that more extensive knowledge allows readers to elaborate content on their own (Gagne, Bell, Weidemann, & Yarbourgh, 1980). This suggests that the amount and kind of background information that a person possesses affects the reading process. Since there is a lack of research on preliterate children's use and development of a story schema, it was the main issue the present study addressed.

<div align="center">Testing for Comprehension</div>

As stated earlier in this paper, schema theory predicts that comprehension will be greater for information in a story that is essential to the story's structure and overall understanding than the syntactic structure of the story or details which are unrelated to the gist (macrostructure) of the story. This prediction is supported by Poulson, Kintsch, Kintsch, and Premack's (1979) study which showed that even four year olds recalled more of the core propositions (higher in the macrostructure) than extra (detail) or spurious (unrelated to story) propositions. Thorndyke (1977) found that subjects tended to recall higher-level organizational elements (propositions) rather than lower-level details. These findings suggest that it is the structure of the story which is retained and remembered.

Because the present study examined the effects of asking integrating or detail questions during story presentation, it is crucial to remember that it is generating bridging inferences which enhances and enables full comprehension of a story and its

structure. A difference between past studies and the present one is that the present study measured comprehension by the ability to make inferences, not the ability to accurately retell the story. The importance for this change in the measure of comprehension is due to findings which show that it is the overall structure and "gist" of the story which is remembered. Because the structure is remembered and the story is organized in this structure, then the child can continue to make inferences about the story. The present study examined schema facilitation and use. The use of the schema and its organized information was operationalized by the ability to make inferences and to use the organized information.

CHAPTER II

THE PRESENT STUDY

Based on the theory and research presented above, this study investigated the effect of asking questions during story presentation on preliterate children's story schema. Three different story presentation conditions were created based on the types of questions asked; 1) Inference Inducing Questions(IIQ), which utilized questions for which correct answers required making an inference; 2) Detail Questions (DQ), which utilized questions that did not require an inference and pertain to trivial information in the story; and 3) No Questions (NQ), in which no questions were asked during story presentation. The NQ condition was included to determine if story questions facilitate comprehension and permitted baseline information to determine the direction of the effects in the other two condtions. In other story presentation conditions, questions were asked at the end of each episode of the story (Mandler & Johnson, 1977) because it is assumed that, at these places in the story, schema facilitation will be most likely. The DQ condition was added to determine if story comprehension is facilitated regardless of the type of question asked. The NQ condition permits baseline information to determine the direction of the effects in the other two conditions. The main goal of the present study was to investigate whether this story presentation

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variable affects the use of preliterate children's story schema by helping them to process the information that is given before the question is asked. An example of an inference inducing question is as follows: "Why did Whiskers follow the footprints into the woods? Because he wanted to find out what animal made the footprints or because he wanted to get away from Michael?" This question was asked after the Setting because it might facilitate the integration of all the information presented in that particular episode. An example of a detail question asked also at the end of the setting is as follows: "Before Whiskers followed the footprints into the woods, what did Whiskers have around his neck? A rope or a leash?" This question was not expected to facilitate schema development because it does not require an integration of the information in the episode but, rather, only requires simple recall.

If inference inducing questions induce or facilitate such processing that is not typically accomplished spontaneously, then children given integrating questions during the story were expected to perform better on the comprehension tests than children asked detail questions and children asked no questions. The current study also investigated the developmental differences in story comprehension by comparing Preschool children (approximately 5.5 years olds) with Kindergarten children (approximately 6.5 years old). It is predicted that, overall, Kindergarten children will perform better than Preschool children on the tests.

In addition to these two main effects, for grade and story presentation, an interaction between the two is expected. Children may perform better when asked inference inducing questions than when asked detail questions or asked no questions.

Because it is probable that an effect of story presentation type will vary across developmental level, both Preschoolers and Kindergarteners were included in this study. For example, Preschoolers, who have less experience with stories, might benefit more from the IIQ, while Kindergarten children, who have more experience with stories, may perform at a consistent level regardless of the story presentation condtion. If this interaction is found, then a production deficiency hypothesis is supported. This states that Preschool children do have a schema, but fail at their application of the schema unless prompted by the IIQ. On the other hand, an interaction may occur indicating no difference between the three story presentation conditions among Preschool children, but it is the Kindergarteners who perform better when asked inference inducing questions. Such a finding would support mediational deficiency hypothesis stating that younger children perform worse than older children because they lack the cognitive ability or process which the task requires. In the present study they may lack knowledge of, or inability to use, a story schema. Another possiblity may be that among both Kindergarten children and Preschool children benefit from the IIQ, such a finding could reflect a production deficiency at both developmental levels.

This study also examined the differences between performance on comprehension and detail tests which were given immediately after story presentation and delayed comprehension and detail tests given one week later. An interaction between the type of test, detail or comprehension, and the type of story presentation was hypothesized. Performance on the detail test may vary as a function of the three

story presentation conditions. The DQ asked during story presentation may facilitate performance on the detail tests. To the extent that the IIQ during story presentation may induce more effective organization of the story, performance on the comprehension test, but not necessarily the detail test, was expected to be facilitated. In so far as a mediational deficiency or production deficiency is present only among preschoolers, a three-way interaction with the grade variable would be expected.

For example, the Preschoolers asked IIQ might show a greater benefit from the inference inducing questions than their Kindergarten counterparts by performing better on the comprehension test than the detail test. The younger children have a primitive story schema which is facilitated by the inference inducing questions and aid performance on the comprehension test. The Kindergarten children aready have a more functional story schema and therefore it is not as facilitated by the inference inducing questions as the Preschoolers. However, if the four year olds show evidence of a production deficiency, it may be that the six year olds show a greater benefit from the inference inducing questions than the four year olds by performing better on the comprehension than the detail test. The younger children either may not have a developed enough story schema to benefit from the questions, but the six year olds, who have more experience with stories, may benefit from the inference inducing questions.

Additionally, it was hypothesized that performance on the comprehension test would differ little across time, but that detail test scores would decrease on the delayed

test. This is based on the research which shows that it is the overall structure of the story which is remembered, not details or specific syntax (e.g., Kintsch, 1992). Since the main purpose of the story schema is to facilitate organization and thereby comprehension of the story, consistent performance across time on the comprehension test is evidence of story schema use. This two-way interaction between time and type of test may be further explained by two three-way interactions. One, it was hypothesized that Kindergarten children would perform consistently on the comprehension test, but performance would drop on the delayed detail test. On the other hand, the Preschool childrens' performance is expected to decrease across time on both the comprehension and the detail test. If the Kindergarteners have a more functional schema because they have had more experience with stories, they may remember more of the gist of the story than its details across time. The four year odds, who may have the a primitive story schema and less experience with stories, may forget both important story information as well as the details of the story.

A significant Story Presentation by Type of Test by Time of Test interaction might be obtained if performance on the delayed comprehension test is improved because of the influence of the IIQ treatment. It was hypothesized that children in the inference inducing condition would perform consistently across time on the comprehension test, but may drop on the delayed detail test. The inference inducing questions may have induced more effective processing of the story information which enables them to retain accurate comprehension one week later. In contrast, children in the DQ and NQ conditions may show a performance decline on both types of tests

over time. Not being given schema facilitating questions, they were not expected to comprehend and organize the story as well and therefore were expected to show poorer memory for the gist as well as the details of the story one week later.

CHAPTER III

METHOD

Participants

Forty-two Preschool children (M=70.52 months, sd=7.687) and 42 Kindergarten children (M=83.452 months, sd=9.168) participated in this study. Of the Preschool children, 23 were females and 19 were males and of the Kindergartnen children, 21 were females and 21 were males. All the preschool participants were children who attend a preschool or a kindergarten in the Dayton area.

Materials

Two children's stories were used, Whiskers' Adventure and A Boy, a Dog, and a Frog [1] (see Appendix A). There are five parts to each story, a Setting, a Beginning, a Reaction One, a Reaction Two, and an Ending. In the IIQ and DQ condtions, a questions was presented following each part of the story except the Setting. Four Inference Inducing Question and four Detail Questions were developed for each story (Appendix C). The question asked during the story was initially open-ended, allowing the children to answer on their own. However, if the child did not respond or answers incorrectly, then choices were given by the experimenter. For the no question condition, the experimenter read the without interruptions.

Examples of the questions asked during the presentation of the story are also listed in Appendix C. The story presentation questions were constructed so that the Detail Questions and the Inference Inducing Questions matched on both amount of story information given and the content of the question in order to maintain internal validity. For example, the IIQ question asked after the Setting, "Why did Peter and Rags run down the hill as fast as they could?" was matched with the corresponding detail question asked at the same point in the story, "When Peter and Rags ran down the hill as fast as they could, what did Peter and Rags fall over?" The two questions have the same stem and ask for information presented about the same point in the story.

The test questions used to measure comprehension consisted of questions for which a correct answer required making an inference. The detail test questions, which consisted of questions about trivial facts given in the story, were used to measure memory for details. The test questions were constructed so that the information required to answer them correctly is different than the information required to answer the Story Presentation questions. An example of a comprehension test question is as follows: "Why did Peter and Rags want to catch the frog?" If a correct response was not given, then the following alternatives were presented: "So Peter could use his new net or because there was nothing else to catch." An example of a detail test question is as follows: "What kind of bath did Peter and Rags take? If a correct response was not given, then the following alternatives were presented: "A warm bath or a soapy bath." All test questions are listed in Appendix D.

The parents were asked questions pertaining to the amount of time they spend reading to their child. This questionnaire was attached to the parental permission sheet (see Appendix E).

Design

This study used a 2 (Grade) X 3 (Story Presentation) X 2 (Type of Test) X 2 (Time of Test) mixed factorial design. The Story Presentation and Grade variables were between subjects and the Time of Test and Type of Test variables were within-subjects. The three Types of Story Presentation were: 1) inference inducing questions (IIQ), 2) detail questions (DQ), and 3) no questions (NQ). Developmental differences were explored between Preschool and Kindergarten children. The two types of tests are comprehension and detail. The two times of tests were immediately after story presentation and again one week later. Time of Testing was manipulated in order to deterimine whether information pertaining to the story's gist or overall structure and meaning is better retained over time than are the details of the story.

Procedure

In accordance with APA ethical guidelines, permission and cooperation was granted from the child care center, the school, and parents prior to any testing (see Appendix D).

Within each Story Presentation X Story Order combination, there were approximately equal numbers of males and females (Refer to Table 1).

Session One. Presentation of all material was individually and orally presented by the experimenter in a private room at the child care center or school. Once in the

room, the experimenter read the first story followed by the comprehension and detail

tests for that story. Both story questions ans test questions were initially open-ended.

This was followed by the presentation of alternatives if no answer or an incorrect

answer was given[2]. After a 30 to 60 minute delay, the second story was read followed

by its comprehension and detail tests. The experimenter recorded the children's

answers to both the story presentation questions and the test questions during the

testing session. Additionally, each experimenter tape-recorded four childrens' test

responses to be used for an inter-rater reliability check.

Session Two. One week after Session One, the same experimenter re-

administered both tests individually and in the same story order as assigned in Session

One. Again, a 30 to 60 minute break occurred between testing Story 1 and Story 2.

Dependent Measures

Total Points. This dependent variable was calculated by awarding two points

for a spontaneously correct answer, 1 point for choosing the correct alternative, and 0

points for choosing the incorrect alternative.

Total Spontaneously Correct. Only the questions answered correctly in a

spontaneous manner were counted as correct. Accordingly, credit was not given for

chosing the correct alternative

Total Number Correct. The most lenient criterion was the total number of

questions answered correctly either spontaneously or by choosing the correct

alternative. In this case, one point was assigned per correct answer, without giving

more credit to questions answered correctly in a spontaneous manner.

CHAPTER IV

RESULTS

Inter-rater Reliability

     The purpose of the reliability test was to determine whether the three experimenters rated the spontaneously answered comprehension tests questions similarly. Each of the experimenters rated eight subjects' comprehension test responses. Each subject had four comprehension tests; an immediate test for the two stories and a delayed test for the two stories. Each experimenter read each response and indicated whether the response would be accepted as correct or incorrect. Percent agreement was calculated between each of the three pairs of experimenters. The three percentages were averaged, yielding an overall percent agreement of 82%[3]. For the remaining 18%, the points assigned by the experimenter who did the testing was accepted as the final responses.

Preliminary Analysis on Total Points

     Two preliminary analyses were conducted to determine whether gender and story differences occurred. The analyses were performed on the total number of points obtained on each test.

     First, a 3(Story Presentation) X 2(Grade) X 2(Time) X 2 (Type of Test) X 2(Gender) mixed ANOVA performed on the number of total points on the test

questions revealed females performed significantly better (M=30.73) than males (M=27.98) $F(1,69)$=4.62, $p<.05$, but gender did not significantly interact with any of the main variables. Due to the strict counterbalancing of all major variables within gender, the gender variable was not included in subsequent analyses.

Second, a separate 3(Story Presentation) X 2(Grade) X 2(Time of Test) X 2(Type of Test) x 2(Story) mixed ANOVA performed on the number of total points revealed a main effect of Story, $F(1.75)$=11.81, $p=.001$. Children performed better on Whiskers' Adventure (M=15.19) than A Boy, A Dog, And A Frog (M=14.42). Refer to Tables 2a and 2b. First, a Story X Grade X Type of Test interaction was significant, $F(1,75)$=5.0, $p<.05$. The largest developmental difference showed that Kindergarten children performed significantly better (M=31.55) than Preschool children (M=26.72) on the comprehension test for A Boy, A Dog, And A Frog, $t(1,81)$=3.69, $p<.008$. Refer to Table 3a. Second, the Story x Test X Time interaction was significant, $F(1,75)$=6.48, $p<.05$. Children performed better on the delayed comprehension test for Whiskers' Adventure (M=15.43) than for A Boy, A Dog, And A Frog (M=14.02), $t(1,81)$=3.75, $p<.008$. (See Table 3b). The Story variable was not included in the subsequent analyses for three reasons: 1) Including it does not significantly change any of the other main results, 2) story order was counterbalanced with type of Story Presentation and Grade, and 3) It has no theoretical bearing.

Overview of Main Analyses

The 3 (Story Presentation) X 2 (Grade) X 2 (Type of Test) X 2 (Time of Test) ANOVA performed on the three different dependent variables yielded similar results.

The primary ANOVA was on total points. As compared to the analysis of total points, the analysis on total number spontaneously correct revealed two additional main effects whereas the analysis on total correct showed an additional 3-way interaction.

Total Points[4]. Further analyses were performed upon total points, collapsed across gender, experimenter, and story. A 3(Story Question) X 2(Grade) X 2(Type of Test) X 2(Time of Test) mixed ANOVA was performed on the total number of points (see Table 4). The results indicated that Kindergarten children performed better (M=123.88, sd=25.70) than the Preschool children (M=112.54, sd=21.51), $F(1,75)$=4.51, p<.05. The difference between performance on the immediate test (M=58.57, sd=12.19) and the delayed test (M=59.85, sd=13.05) was not significant, $F(1,75)$=2.66, p>.05. The difference between performance on the two tests, comprehension (M=60.23, sd=13.17) and detail (M=58.19, sd=13.35) was also not significant, $F(1,75)$=2.94, p>.05. Additionally the Story Question conditions were not significantly different (Refer to Table 4 for means).

A Time by Test interaction was significant, F (1,75)=9.98, p<.005. Performance on the comprehension test remained unchanged across time, (Immediate, M=30.02, sd=6.95; Delayed, M=29.59, sd=7.5), $F(1,77)$<1.00, whereas performance on the detail test increased over time (Immediate, M=28.26, sd=6.8; Delayed, M=29.93, sd=7.12), $F(1,75)$=13.79, p<.025, adjusted using Bonferroni.

The Grade X Time interaction was also significant, $F(1,75)$=5.53, p<.05. Preschool children's performance did not significantly change over time (immediate, M=56.21, sd=28.10; delayed, M=55.02, sd=27.51), $F(1,36)$<1.00. However,

Kindergarten children performed better on the delayed test ($\underline{M}$=63.43, sd=14.11) than on the immediate test ($\underline{M}$=60.45, sd=12.34), $\underline{F}$(1,36)=8.67, $\underline{p}$<.012, adjusted using Bonferroni.

Spontaneously Correct Answers(footnote 3). A four-way mixed ANOVA was also performed on the total number of questions answered correctly in a spontaneous manner. This is the strictest criteria because choosing the correct alternative is not counted as correct.

Three main effects were found. First, Kindergarten children performed better ($\underline{M}$=44.43, sd=16.23) than Preschool children ($\underline{M}$=37.24, sd=14.78), $\underline{F}$(1,75)=4.1, $\underline{p}$<.05. Second, performance was better on the delayed test ($\underline{M}$=21.43, sd=8.46) than on the immediate test ($\underline{M}$=19.40, sd=8.00), $\underline{F}$(1,78)=17.47, $\underline{p}$<.001. The third main effect revealed better performance on the comprehension test ($\underline{M}$=21.31, sd=8.33) than on the detail test ($\underline{M}$=19.52, sd=8.88), $\underline{F}$(1,78)=5.83, $\underline{p}$<.02.

As in the analysis of total points, the current analysis also revealed a Time x Test interaction, $\underline{F}$(1,75)=29.24, $\underline{p}$<.001. For the Detail test, children performed better on the delayed test ($\underline{M}$=10.75) than on the immediate test ($\underline{M}$=8.77), $\underline{F}$(1,78)=51.89, p<.008. The Grade X Time interaction was only marginally significant, $\underline{F}$(1,78)=3.31, $\underline{p}$=.07. Unlike the Preschool children, Kindergarten children improved across time (Immediate $\underline{M}$=10.38; Delayed $\underline{M}$=11.83), $\underline{F}$(,1,78)=25.74, $\underline{p}$<.01, adjusted using Bonferroni.

Total Number Correct. A four-way mixed ANOVA was also performed on the total number of correct responses, either spontaneously or correctly recognized. The

dependent variable was calculated by awarding one point either for a correct answer given spontaneously or for choosing the correct alternative. Therefore this variable does not distinguish between a spontaneously correct answer and a selection of a correct alternative.

Again, Kindergarten children answered more questions correctly ($\underline{M}$=39.73, sd=5.73) than preschool children ($\underline{M}$=36.10, sd=5.53), $\underline{F}$(1,78)=10.44, $\underline{p}$=.002.

The Time x Test interaction is not significant, $\underline{F}$(1,75)<1.00. Although subsumed by a Grade X Time X Test three-way interaction, a Grade X Test was found, $\underline{F}$(1,78)=4.25, $\underline{p}$<.05. Although, Kindergarten children performed better than preschoolers on both tests, the differences were greater on the comprehension test ($\underline{M}$s=40.31, and 35.64; sds=6.23 and 4.96, for Kindergarteners and Preschoolers, respectively), $\underline{F}$(1,78)=14.81, $\underline{p}$<.012, than on the detail test, ($\underline{M}$s=39.14, and 36.55; sds= 5.22 and 6.12, respectively), $\underline{F}$(1,78)=4.32, $\underline{p}$=.041(unadjusted). Two interactions were found to be marginally significant, Grade X Time, $\underline{F}$(1,78)=2.97, $\underline{p}$=.089; and Story Presentation X Test, $\underline{F}$(2,78)=2.78, $\underline{p}$=.068.

The Grade X Test must be qualified given the significant Grade X Time X Test interaction, $\underline{F}$(1,78)=6.79, $\underline{p}$=.01. Kindergarten children performed better ($\underline{M}$=20.33) than Preschoolers ($\underline{M}$=17.21) only on the delayed comprehension test, $\underline{t}$(1,82)=4.77, $\underline{p}$<.008. Refer to Table 5 and Figure 1.

Reading Time and Test Performance

Correlation were calculated to determine whether the amount of time spent being read to outside of class predicted performance on the two tests, comprehension

and detail tests. No significant relationship was found between the number of hours spent reading outside of school ($\underline{M}$=3.387) and performance on the comprehension test $\underline{r}$(84) = -.07, $\underline{p}$>.05. Similarly, reading time did not significantly predict performance on the detail test, $\underline{r}$(84)=.03, $\underline{p}$>.05. The mean hours read to outside of school for Preschoolers and Kindergarteners were 3.60 and 3.18, respectively.

Responses to Story Questions

As displayed in Table 4, the means for the three Story Question conditions suggest that the questions may have had an effect on test performance which is not found in the ANOVA due to the large inter-individual variability in test performances. For example, the mean comprehension test performance was lowest under the No Question Story Presentation condition on the immediate and detail tests for both grades.

There may be two types of training effects for the story questions, one for Inference Inducing questions and another for Detail questions. The Inference Inducing questions may prime subjects to perform better on the comprehesion test measures, but not on the detail test measures. On the other hand, the Detail story questions may prompt better performance on the detail test measures, but not on the comprehension test measures. In other words, the story questions may have a specific training effect on the related test measures, and no effect on the other test. Therefore correlations between story question performance and test performance were calculated separately for the Inference Inducing condition and the Detail condition. These correlations were calculated separately for each Grade due to the strong effect for Grade found in the

ANOVAs. The correlations are presented in Table 6.

For Preschool children, detail story questions significantly predicted performance on the immediate detail test, $r(13)=.73$, $p<.01$; the delayed detail test, $r(13)=.66$, $p<.05$; and total detail test performance, $r(13)=.71$ $p<.05$. Performance on the Inference Inducing questions did not signficantly predict performance on any of the test measures.

However, for Kindergarten children, there is a different pattern of predictability. Performance on both the inference inducing story questions and the detail story questions significantly predicted performance on all comprehension and detail test measures (Refer to Table 6).

A test of difference between two independent correlations (using r to Z transformation) were performed in order to determine if the correlations involving responses to the Inference Inducing questions differ from the correlations involving responses to the Detail questions. Again, different patterns of results were obtained across grade. For the Preschool children, the correlations were significantly different across Story Question condition for the three detail test measures; immediate, delayed, and total. In other words, performance on the detail test is predicted better by responses to story detail questions than by responses to story inference inducing questions.

For the Kindergarten children, in no case did a correlation between responses to inference inducing questions and scores on a particular test differ from the corresponding correlations between responses to detail questions and scores on that

test. This finding is due to the fact that responses to both types of Story Presentation questions signficantly predicted performance on both the tests.

The finding among Preschoolers that the responses to detail story questions better predicted detail test performance than did responses to inference inducing story questions could have resulted from selective facilitation of detail test performance on the DQ condition (or interference with detail test performance in the IIQ condition). This effect would tend to decrease the correlation between comprehension and detail test performances. Therefore, among Preschoolers, one would expect a lower correlation between comprehension test and detail test performances in the DQ and IIQ Story Presentation conditions than the NQ condition. In addition, the former correlations would be expected to be lower than the correlations among Kindergarten children. Therefore, correlations were calculated between performance on the detail and comprehension tests within each Grade and Story Presentation condition to assess these indicators of a specific training effect. These correlations are displayed in Table 7.

Since a decline would be expected if story questions did have a differential effect on the comprehension and detail tests, tests of difference (using r to Z transformations) were performed. If the story questions did not have any effect, the correlations would not be expected to differ from the NQ condition. The Story Presentation NQ condition was used as the baseline since they were not asked any story questions which would affect the correlations. Only one test of difference was significant. On the delayed tests, the correlation between detail test performance and

comprehension test performance for Kindergarten children in the DQ Story Presentation condition was significantly lower than the correlation for Kindergarten children in the NQ condition, $z=2.65$, $p<.01$. A clear pattern emerges when comparing correlations between the NQ condition with the correlations within the IIQ and the DQ conditions. For the Kindergarten children, the DQ condition correlations appear to decrease more than the IIQ condition correlations from the NQ condition.

Another interesting pattern of correlations was obtained from the Preschool children's results. The smaller correlations for the IIQ condition compared to the NQ condition hints that the inference inducing story questions affect performance on the two tests differently. There may have been a trade-off where the inference inducing questions increased performance on the related test and/or decreased performance on the opposite test. The results among Kindergarteners indicates the possibility of such an effect of detail questions. In sum, there is some evidence that, among Preschoolers, inference inducing story questions differentially influence comprehension and detail test performances, while, among Kindergarteners, detail questions differentially influence comprehension and detail test performances.

CHAPTER V

DISCUSSION

The purpose of this study was to investigate whether preliterate children's story comprehension can be facilitated by presenting them with different types of story questions. It was proposed that asking inference inducing questions during the story would facilitate organization of the story elements into a story schema. The better organization of the story elements should lead to better comprehension of the story at the time of test. On the other hand, asking questions about story details while presenting the story would not facilitate organization. Additionally, these questions may have a different effect on the two grades, Preschool and Kindergarten.

Developmental Differences

A main issue examined in this study is developmental differences due to the greater world knowledge and story experience of the older children. Intriguing findings are the interactions between Grade, Time, and Test. As expected, Kindergarten children performed better on the tests than Preschool children, which is consistent with previous research (e.g., Hinchley & Levy, 1988; Paris and Lindauer, 1976; Poulson, Kintsch, Kintsch, & Premack, 1979). These developmental differences are mainly a function of the older children possessing more background or world knowledge and experience to facilitate the interpretation, organization, and

understanding of the stories.

One of the main focuses of the present study is in regards to preliterate children's ability to make inferences. The findings revealed that the younger children do possess the ability to make inferences, although the older children are more accomplished. The main difference between the two grades is in regards to performance on the delayed comprehension test. Kindergarten children perform better a week later than the younger children because their comprehension test performances increase. Although they didn't look at differences across time, this finding is congruent with Poulson, Kintsch, Kintsch, and Premack (1979) who found that older children remember more core story propositions than younger children. The present findings also suggest that while younger children tend to forget some of the story's gist over time, older children retain this information. This finding may be due to older children's more knowledge of the world, more experience with stories because they are older, and the possession of a more developed story schema which better organizes important story propositions for later recall.

Developmental Differences and Story Presentation

One of the most interesting findings is the different patterns of predictability of the story questions for the two grades. For the Kindergarten children, it appears not to matter what type of story questions are asked, for responses to both inference-inducing and detail questions predicted performance on both the comprehension and detail tests. Perhaps, both types of story questions have the potential of increasing the utilization of an appropriate story schema which, in turn, facilitates retention of important, implicit

information as well as relatively trivial details. Alternatively, the responses to both types of story questions may merely reflect the extent to which a story schema is already being utilized, the story questions having little or no influence on the process.

The story questions had an entirely different pattern of predictability for Preschool children. First of all, story question performance only predicted performance on the detail test measures. However, the predictability of these measures only occurred for children who were asked story detail questions. Comprehension was not predicted by either the detail or the inference inducing story questions. One explanation may be that asking inference inducing story questions may be disruptive of the normal comprehension process that goes on during story presentation. However, this explanation seems to be doubtful due to the finding that the correlation between responses to inference inducing questions and comprehension test performance is higher than the corresponding correlations between responses to inference inducing questions and detail test performance. If the inference inducing story questions were very disruptive, the correlations would be lower or even negative. One reason for the lack of higher correlation values may be that four inference inducing story questions with no corrective feedback are not sensitive enough to predict performance on the comprehension test measures.

Story Presentation

Little support was found in the main analysis that asking different kinds of story questions affected test performances. However, an effect may have been masked by large individual differences within each story question condition. Post hoc

analyses, which are not affected by such the individual differences, revealed that the inference inducing story questions administered to preschoolers reduced the correlation between comprehension test and detail test performances. In addition, detail questions administered to Kindergarteners also reduced the correlations between the two types of test scores. Such findings are consistent with a specific effect limited to facilitation of test items corresponding to the type of story question. More specifically, inference inducing questions facilitate comprehension-related test questions, on the one hand, while detail story questions enhance performance on the detail-related test questions. In contrast, effects in the opposite direction would show inference inducing story questions interfering with detail test performance while detail story questions interfering with comprehension test performance. Future studies story questions could implement a within-subjects manipulation of story questions to determine if such an effect occurred or, alternatively, whether there were differential effects in the opposite directions for the two types of test performances.

In addition, the four story questions may not have been enough to increase the children's use of the story schema or to override the individual differences found at these ages. In an experiment by Ackerman (1988), children were asked an inference question about the resolution before the resolution was given, then re-asked the question after presenting the resolution. He found that young children, when re-asked the inference question, do not show sensitivity to resolution information. This may also be what is happening with the inference inducing story questions. Children answer the inference question, but are given no feedback to its correctness. Therefore

the children assume they are correct and continue to have an incorrect interpretation and organization of the story information. Giving corrective feedback may enhance comprehension and permit the inference inducing story questions to better facilitate story comprehension. In other words, the mere asking of story related questions during the story presentation may not significantly facilitate story comprehension. Further studies giving a more sensitive experimental treatment involving corrective feedback may help children organize the story, thereby facilitating later comprehension test performance.

Memory for Story Gist and Details

Given a spontaneously correct response on the immediate test, the conditional probability of a spontaneously correct response on the delayed test was calculated separately for the comprehension and detail test items (Refer to Table 8). Hence, two conditional probabilities were obtained for each subject. Among Preschoolers, the detail test conditional probability was higher for 30 children, while the comprehension test conditional probability was higher for only 9 children. According to a binomial test[5], using a normal curve approximation, the conditional probability associated with the detail test is more likely to be higher than the conditional probability associated with the comprehension test, z=3.36, p<.01. This result provides further evidence that the story's details are more resistant to forgetting than the implicit information, and these results cannot be attributed to learning that could occur when the correct answer is provided in a forced-choice procedure. This is consistent with the finding that Preschooler's detail test scores increase across time and their comprehension test

scores decrease over time.

In contrast, for Kindergarten children, the number of times the conditional probability was higher for the detail test than the comprehension test (detail higher n=23; comprehension higher n=18) was not significant, $z=.78$, $p>.05$ (Refer to Table 8). For the older children, there is no difference in the retention of the story's implicit information and trivial details. Overall, Preschool children spontaneously remember more story details than its gist whereas Kindergarten children remember them both equally.

Another possible reason for the improvement on the detail test over time may be the availability of cognitive processing capacity. Suppose that on the delayed test more cognitive processing capacity becomes available. During the story and immediate tests, children may be processing the information from the story and organizing it into a schema. However, the schema for the story may have already been developed by the time of the delayed test. Therefore, the additional cognitive capacity available on the delayed test might be directed toward the retrieval of details in the story. They can only remember what is in the schema for the comprehension test, but the extra processing time may help them be able to remember the details of the story especially after hearing the options from the immediate test.

In conclusion, the main findings of this study reveal strong developmental differences between Preschool and Kindergarten children's story comprehension. Developmental differences were found which showed that older children performed better on the delayed comprehension test than the younger children. The older

children remember more of the story's gist over time than the younger children.
Because of the strong differences found between Preschool and Kindergarten children,
further studies should also continue to investigate the use and facilitation of the story
schema with pre-literate children. There appears to be a definite developmental
difference in the facilitation and use of a story schema by Preschool and Kindergarten
children.

Although the story questions did not have a direct effect on test performance,
they do predict test performance differently for the detail and comprehension tests
within the two grades. In order to detect an effect of different types of questions
asked during story presentation, it is suggested that future studies increase the number
of story questions and the complexity of the story structure along with utilizing a
within-subjects design.

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FOOTNOTES

1   The stories were written by Ron Katsuyama, PhD. Other versions of these stories were used in Garlitz (1981).

2   Because the answer to the detail story and detail test questions can be regarded as simple, children may give a spontaneous incorrect answer which is the incorrect alternative on the test. For example, on the question, "What did the frog follow to Peter's house?" a child may spontaneously respond "footprints," which is incorrect. The next step in the procedure was to present the alternatives, however, the alternatives were "footprints" (the incorrect choice) and "tracks" (the correct answer). If, as in the example, the child spontaneously answered "footprints," another alternative must be given. Therefore, the list of alternatives contain two that are incorrect and one that is correct. In this example, the experimenter would present the incorrect alternative "a path" with the correct choice "tracks."

3   Although lower than desirable, it is unlikely that it influences the main findings, especially due to the strict counterbalancing of major factors that was maintained within experimenters.

4   The interaction results obtained from the analysis of total number spontaneously correct is identical to the results of total points. Additionally, the analysis of total spontaneously correct revealed a Time and a Test main effects which was not found in the analysis of total points.

5   A binomial test using a normal curve approximation was performed due to the presense of several conditional probability values of zero and one which are a result of the small N.

APPENDIX A

Whiskers' Adventure

Setting

Once upon a time there was a young boy named Michael who had a little brown dog named Whiskers. Michael and Whiskers were best friends, and they went everywhere together. They liked to go for walks and look for butterflies. One winter morning after a snowfall, they decided to go for a walk in the woods. Before they went for their walk, Michael tied a rope around Whiskers' neck. While they were walking, Whiskers saw footprints in the snow going into the woods.

Event Structure

Beginning

He followed the footprints leading him into the woods. As he tugged on the rope, it suddenly broke. Michael yelled, 'Come back Whiskers, come back.' But, it was too late. Whiskers had already disappeared into the woods. (Question 1 asked here).

Development

Reaction One: Goal Path.

The footprints lead Whiskers far into the woods. There, he spotted a rabbit named Jojo. Whiskers began to play a fun game of tag with Jojo. They had a

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wonderful time together and soon became good friends. (Simple Reaction =>)

Suddenly, Whiskers spotted a fox that was out hunting for food. The fox was headed their way and was coming closer and closer. Whiskers was frightened and looked around for a place to hide. But Jojo whispered softly, "Come Whiskers, follow me." So off they ran toward Jojo's home. The fox saw them and began to chase them. Oh, how fast that fox could run! But, thank goodness Jojo and Whiskers had a head start. Jojo hopped over bushes and rocks. But poor little Whiskers had to scamper around them. Jojo looked back and saw the fox catching up with poor little Whiskers. So he led Whiskers to a meadow where there were no bushes or rocks, and they could run straight ahead. Finally, they reached Jojo's home under a tall pine tree. It was just in time, for the fox was right behind them. Whiskers was so thankful as he squeezed into the entrance of Jojo's home. (Question 2 asked here).

Reaction Two: Goal Path.

Whiskers followed Jojo farther into the rabbit hole. Finally, they came to a big room where the rabbit family lived. Jojo asked his new friend to stay for dinner. The rabbit family usually ate radishes for dinner. But they always had carrots when a special friend came to visit. So, Mama Rabbit cooked a big pot of fresh carrots. Before he served the rabbit family, Papa Rabbit filled Whiskers' bowl full of carrots. Whiskers thanked the rabbits for being so kind. As a good friend and guest, he tried very hard to finish all his carrots. After dinner, Whiskers played games with the rabbit family. The baby rabbits had great fun climbing on his back and taking a ride. They had so much fun that the afternoon went by quickly. (Simple Reaction

=>) Whiskers wondered what time it was when he started to feel tired. (Attempt =>)
He did not want to leave his new friends, but it was time to go home. So the rabbits
took Whiskers to the front of their home. Jojo bravely went outside first, to
have a look around. He took big sniffs in the air to check if it was safe for everyone
to go outside. Papa and Mama Rabbit asked Whiskers to come back and visit again in
the Spring when the tulips begin to grow. The baby rabbits waved goodbye to
Whiskers and began to cry. It would be a long time until Spring. (Question 3 asked
here).

Ending

Jojo led Whiskers safely through the woods. Meanwhile, back at home,
Michael had been sitting and waiting for Whiskers by his front door for eight long
hours. He had grown cold and tired, and he began to cry. He wiped away tears with
a big handkerchief. Michael was afraid that he would never see Whiskers again.
When Whiskers came out of the woods and raced to the house, he saw Michael
crying. Whiskers quietly went up to Michael and gently licked his cheek. Michael
looked up and, when he saw that it was Whiskers, he gave his puppy a big hug.
Then, Michael went inside to fix Whiskers his favorite meal of biscuits. Whiskers
wagged his tail. How wonderful it was to be back at home with Michael! (Question
4 asked here).

A Boy, A Dog and a Frog

Setting

Once upon a time there was a little boy named Peter who had a playful little puppy named Rags. Peter was very excited because his Grandpa had just given him a special surprise. It was a net for catching things. Peter said, "Let's see what we can catch at the lake, Rags." So, they hurried up the hill towards the lake.

Event Structure

Beginning

When they reached the top and looked down at the lake below, Peter saw a large, green frog. The frog was sitting by the water enjoying the warm sunshine. "Rags, let's catch that frog!" cried Peter. So, they ran down the hill as fast as they could. The hill was so steep that they began to run faster and faster. Before they could stop they tripped over a stick and landed in the water with a big splash. (Question 1 asked here)

Development

Reaction One: Goal Path

Peter and Rags slowly climbed out of the lake. They were not happy to see the frog still sitting by the lake smiling at them. So Peter jumped toward the frog, trying to catch it with his hands. But, he quickly jumped away onto a large tree branch that had fallen into the water. Peter and Rags knew that this frog was going to be hard to catch. (Simple Reaction =>) They needed to have a special plan. Suddenly, Peter had an idea. He told Rags to climb onto one end of the large tree branch as Peter climbed

onto the other end. (Attempt =>) Then they carefully crawled toward the center where the frog was sitting. They moved very quietly and very slowly while the frog was taking a nap. As he got close to the frog, Peter lifted his net high above his head, ready to trap the frog. At the same time, Rags jumped toward the frog. Peter swung the net down, and instead of catching the frog, he caught poor Rags! The speedy frog had hopped away onto a large rock. He sat and laughed at Peter and Rags. What a rascal he was! That made Peter and Rags angry. They were wet and cold, and this was not fun. Now, all they wanted to do was to go home and get warm and dry. (Question 2 asked here).

Reaction Two: Goal Path.

The frog watched Peter and Rags climb up over the hill. (Simple Reaction =>) Soon they were gone and the frog sat all alone. It was so quiet that all he could hear was the grasshoppers chirping. He began to worry that, because he laughed at Peter and Rags, they would never come back to the lake and play with him. (Attempt =>) The frog looked at their muddy tracks and decided to follow them. He followed the tracks up the hill and down to Peter's house. The tracks led him through the front door and up the stairs. (Question 3 asked here).

Ending

He could hear water splashing in the bathroom. Peter and Rags were enjoying a warm bath. When the playful frog saw Peter and Rags in the bathtub, he jumped high in the air. As he landed upon Rags' head he thought, 'This is much more fun than sitting by myself at the lake.' Peter and Rags looked at each other in surprise.

Now they knew that the playful frog really wanted to be their friend. (Question 4 asked here).

APPENDIX B

Whiskers' Adventure

I. Setting: decide to go for a walk

II. Event Structure

    A. Beginning: Whiskers sees the footprints

    B. Development

        1. Reaction One: Goal Path

            a. Simple Reaction: meets Jojo, fox chases them

            b. Attempt: squeeze into Jojo's home

        2. Reaction Two: Goal Path

            a. Simple Reaction: starts to feel tired, misses Michael

            b. Attempt: decides to leave rabbits and go home

    C. Ending: reunites with Michael

A Boy, A Dog, and A Frog

I. Setting: set out to lake

II. Event Structure

    A. Beginning: see frog, fall in lake

    B. Development

        1. Reaction One: Goal Path

            a. Simple Reaction: try to catch frog, fail, need a plan

            b. Attempt: they crawl on opposite sides of branch

        2. Reaction Two: Goal Path

            a. Simple Reaction: Peter and Rags leave, frog alone

            b. Attempt: frog decides to visit Peter and Rags

    C. Ending: frog joins Peter and Rags, become friends

Whiskers Adventure

Integrative

1. Why did Whiskers follow the footprints into the woods? because he wanted to find out what animal made the footprints or because he wanted to get away from Michael

2. Why did Jojo whisper, "Come Whiskers, follow me"? so Jojo could safely lead Whiskers to his home or because Jojo saw a hole to hide in

3. Why did Whiskers leave the Rabbit family? because he didn't like playing games anymore or because he missed Michael

4. Why did Michael begin crying? because he was cold sitting outside or because he missed Whiskers

Detail

1. Before Whiskers followed the footprints into the woods, what Whiskers have around his neck? a rope or a leash or a cord

2. Before Jojo whispered, "Come Whiskers follow me", what kind of game were Whiskers and Jojo playing? ball or hide and seek or tag

3. Who waved goodbye as Whiskers was leaving the Rabbit family? the baby rabbits or Papa Rabbit or Jojo

4. What did Michael use to wipe away his tears as he cried? a tissue or a rag or handkerchief

A Boy, a Dog, and a Frog

<u>Integrative</u>

1. Why did Peter and Rags run down the hill as fast as they could? because they were excited about the seeing the frog or because they wanted to jump into the water?

2. How did Peter feel when the frog hopped away? sad because they didn't catch anything or sad because he lost his net

3. After Peter and Rags left the lake, what was the frog thinking about? did the frog think that Peter and Rags would not want to be friends with him or was he thinking about what kind of game they could all play at the lake tomorrow

4. How did Peter and Rags feel about the frog when the frog jumped on Rags' head? did they dislike the frog because he was being so silly or did they like the frog because he wanted to be with them

<u>Detail</u>

1. When Peter and Rags ran down the hill as fast as they could, what did Peter and Rags fall over? a stick or a rock or branch

2. When the frog hopped away, where did it go? swim in the lake or to sit on the grass or to sit on a large rock

3. After Peter and Rags left the lake, what could the frog hear? the grasshoppers chirping or birds singing or the wind blowing

4. Where were Peter and Rags when the frog jumped on Rags' head? in

bed or in a chair or in the bathtub

Whiskers Adventure

<u>Comprehension Test Questions</u>

1. How did Michael feel when he yelled at Whiskers to come back? angry at Whiskers for not coming back when Michael yelled or afraid that Whiskers might get lost

2. Why didn't Whiskers come back when Michael yelled for him? because he didn't hear Michael yell or because he didn't want to go for a walk with Michael

3. As Whiskers chased the footprints into the woods, how was he feeling? was he happy to leave Michael behind or was he excited to find out who made the footprints

4. After they spotted the fox, why did Jojo and decide to run? because Jojo knew they would need a head start or because Whiskers found a place to hide

5. Why did Jojo lead Whiskers to a meadow? so Whiskers could run faster to escape from the fox or because the meadow was the fastest way to Jojo's house

6. Why did Whiskers feel lucky as he squeezed into Jojo's home? because he barely escaped from the fox or because it was cold outside and he wanted to get warm

7. Why did the rabbit family have carrots for dinner? because they always eat carrots or because Whiskers was a special guest

8. Why did the baby rabbits cry as they waved goodbye to Whiskers? because the Mama Rabbit wouldn't let them come outside or because they knew it would be a long time before Whiskers would come back

9. Before Whiskers left the rabbit family, why did Jojo go outside first, to look around? because he wanted to see if the fox was nearby or because he wanted to see if it was snowing outside

10. What was Michael thinking about as he began to cry? that his mother would be mad at him for walking near the woods or that Whiskers was lost

11. Why did Whiskers lick Michael's cheek? because he was sorry he made Michael cry or because he always licks Michael's cheek before dinner

12. Why did Whiskers wag his tail at the end of the story? because he was happy to be home with Michael or because he wanted to tell Michael all about Jojo and his family

Whiskers Adventure

Detail Test Questions

1. What color was Michael's little puppy, Whiskers? black, brown, or gray

2. What did Michael and Whiskers like to look for on their walks? bugs, butterflies, or birds

3. What did Michael yell to Whiskers as he was running away? "Come back Whiskers, come back", or "Whiskers! Whiskers!" or "Hey, Whiskers!"

4. When Whiskers saw the fox, what was the fox looking for? food, a squirrel, or a mouse

5. What did Jojo hop over as he ran from the fox?   a hole or a bush or a rock

6. What kind of tree was near Jojo's home? pine, oak, or maple

7. What did the rabbit family usually eat for dinner? carrots, or radishes, or lettuce

8. What did the baby rabbits have fun doing after dinner? jumping over Whiskers, or riding on Whiskers back, or pulling his ears

9. When did Papa and Mama Rabbit want Whiskers to come back for another visit? Fall or Spring or Summer

10. How long had Michael been sitting and waiting for Whiskers? three hours or eight hours or five hours

11. What did Michael do when he saw Whiskers? hug him or smile at him or kiss him

12. What was Whiskers' favorite meal? biscuits or bones or treats

A Boy, A Dog, and A Frog

<u>Comprehension Test Questions</u>

1.   Why did Peter and Rags want to catch the frog? so he could use his new net or because he wanted a pet frog

2.   Why did the frog smile at Peter and Rags as they climbed out of the lake? because the frog thought it was funny when they fell in the lake or because Peter made a funny face

3.   Why couldn't Peter catch the frog with his hands? because the frog was too slippery to hold or because the frog was too fast to catch

4.   Why did Peter and Rags <u>slowly</u> crawl along the large tree branch? because they didn't want the frog to know they were trying to catch him or because they were afraid of falling in the water

5.   Why did Peter and Rags need a <u>special</u> plan to try to catch the frog? because the frog was too fast for Peter and Rags or because the frog never came out of the water

6.   When Peter swung his net down, why did the frog laugh? because Rags looked silly inside the net or because Peter was laughing at Rags

7.   Why did the frog follow the tracks away from the lake? because he wanted to know who made them or because he wanted to find Peter and Rags and play with them

8.   How did the frog feel when the lake became very quiet? the frog felt lonely or the frog felt happy because he liked the quiet lake

9. How did the frog feel as he followed the tracks? excited to become friends with Peter and Rags or sad to leave his home at the lake

10. Why did Peter and Rags need a bath when they got home? because they had been in the lake or because it was time for bed

11. Why were Peter and Rags surprised when the frog jumped on Rags' head? because they thought the frog did not want to play with them or because they did not think the frog could jump so high

12. Why did the frog jumped on Rags' head? because the frog wanted to play with them or because the frog did not want to land in the bath water

A Boy, A Dog, and A Frog

Detail Test Questions

1. What did Peter's Grandpa give him? a net or fishing pole or bucket

2. What did Peter and Rags have to climb before they got to the lake? a mountain or a hill or a tree

3. After Peter and Rags climbed out of the lake, where was the frog? sitting by the lake or floating in the water or sitting by a tree

4. What did Peter and Rags crawl onto to catch the frog? a fallen tree branch or a row of rocks or a big huge rock

5. What was the frog doing when Peter and Rags were crawling towards him? watching a fly or taking a nap or sunning himself

6. What kind of plan did Peter and Rags need? a special plan or a tricky plan or a smart plan

7. What did the frog follow to Peter's house? footprints or tracks or a path

8. After Peter and Rags left, what was it like at the lake? quiet or peaceful or calm

9. How did the frog get into Peter and Rags' house? through the front door or through the window or through the back door

10. What kind of bath did Peter and Rags take? warm or hot or soapy

11. What did the playful frog do when he saw Peter and Rags in the bathtub? jump on Rags' head or leap onto Rags' head or hop onto Rags' head

12. Where was the bathroom? down the hall or upstairs or downstairs

APPENDIX E

Parental Consent Form

Dear Parent(s),   date, 1995

        I would like to have your permission to allow your child to participate in a
project that I am conducting for my Master Thesis in Developmental Psychology at the
University of Dayton. We are interested in knowing how young children develop an
understanding of stories. We believe this process is important when children later
learn to read.

        Each child will be seen individually by either myself or a trained assistant for a
period of about 30 to 45 minutes. The child will be read two children's stories.
During the reading questions will be asked about important aspects of each story.
Following the reading and again one week later, additional questions will be asked to
determine how much is understood and remembered.

        This brief description omits many details, but hopefully it will give you some
idea about the project's general purpose and procedures. Children of all ages find the
experience of participation enjoyable and rewarding. This task is presented in a non-
threatening manner and each child is given encouragement. Furthermore, the tasks do
not involve "tests" of intelligence or personality.

        If you have any questions about the project, please call me at the University of
Dayton 229-2173 (Department of Psychology) or 229-2175 (Psychology Graduate
Assistant Office). I would appreciate obtaining your consent to allow your child to
participate. (This requires your signature and response to the questions below.) Since
there is a great deal that we do not yet know about children's story comprehension, I
look forward to the opportunity to work with your child and make a contribution
toward understanding this vital process.

        Please fill out the requested information and return the second page to the
school by (appropriate date). Thank you.

Sincerely,
Nan E. Croy   Dr. Ronald M. Katsuyama
Graduate Student   Faculty Advisor

University of Dayton Comprehension Project
Nan E. Croy, Graduate Student

Please check one of the following: _____My child has my permission to participate.
_____My child does not have my permission to participate.

Parent's
Signature_____

Child's Name _____

Child's Birthday_____

Parental Questionnaire

The following questions pertain to the time you and/or another person spends reading to your child. Please answer these questions as accurately as possible.

1.   In an average week, how many hours outside of school does someone spend reading stories to your child?_____

2.   Outside of school, is there a particular time during each day that someone spends reading to your child?
_____ yes
_____ no

3.   If you answered "yes" to the previous question,
(a) when does this occur?_____
(b) how many days per week does this occur?_____

4.   How would you rate your child's interest in stories/books?

No interest			Moderate			High
Interest						
1	2	3	4	5	6	7

Table 1

Number of Participants in the Design

Grade	Story Presentation	Story Order	Comprehension		Detail	
			Immediate	Delayed	Immediate	Delayed
Preschool	IIQ (14)	Boy-Whis	7	7	7	7
Preschool	IIQ (14)	Whis-Boy	7	7	7	7
Preschool	DQ (14)	Boy-Whis	7	7	7	7
Preschool	DQ (14)	Whis-Boy	7	7	7	7
Preschool	NQ (14)	Boy-Whis	8	8	8	8
Preschool	NQ (14)	Whis-Boy	6	6	6	6
Kindergarten	IIQ (14)	Boy-Whis	8	8	8	7
Kindergarten	IIQ (14)	Whis-Boy	6	6	6	7
Kindergarten	DQ (14)	Boy-Whis	8	8	8	7
Kindergarten	DQ (14)	Whis-Boy	6	6	6	7
Kindergarten	NQ (14)	Boy-Whis	7	7	7	8
Kindergarten	NQ (14)	Whis-Boy	7	7	7	6

Table 2a

Means and SDs of Total Points According to Grade, Story

Presentation, Test, and Time for A Boy, A Dog, and A Frog

Test		Preschool			Kindergarten		
		Imm	Del	Tot	Imm	Del	Tot
Inference Inducing Story Questions							
Comp	M	15.00	12.62	13.81	16.43	16.36	16.40
	SD	3.00	3.23		4.09	4.20	
Detail	M	14.31	15.39	14.85	14.43	16.07	15.25
	SD	2.63	3.02		3.69	3.99	
Detail Story Questions							
Comp	M	14.46	13.54	14.00	16.43	15.93	16.18
	SD	4.84	3.43		2.65	3.43	
Detail	M	13.92	14.46	14.19	13.07	14.29	13.68
	SD	3.84	3.69		3.36	3.43	
No Story Questions							
Comp	M	13.15	11.39	12.27	14.50	15.29	14.90
	SD	3.46	3.75		4.62	4.30	
Detail	M	12.54	13.08	12.81	14.00	15.07	14.54
	SD	3.46	3.64		3.94	4.98	

Table 2b

Means and SDs of Total Points According to Grade, Story
Presentation, Test, and Time for Whiskers' Adventure

Test		Preschool			Kindergarten		
		Imm	Del	·Tot	Imm	Del	Tot
Inference Inducing Story Questions							
Comp	M	14.92	14.62	14.77	15.57	16.71	16.14
	SD	3.38	3.71		4.50	4.05	
Detail	M	13.54	14.69	14.12	14.79	16.50	15.65
	SD	3.48	3.88		3.98	3.13	
Detail Story Questions							
Comp	M	15.69	15.92	15.81	16.43	17.29	16.86
	SD	4.39	3.62		3.03	3.56	
Detail	M	14.77	15.08	14.93	14.64	15.29	14.97
	SD	4.97	3.53		3.75	3.89	
No Story Questions							
Comp	M	13.92	13.54	13.73	15.36	15.79	15.58
	SD	3.71	3.82		3.75	4.46	
Detail	M	13.39	13.69	13.78	16.00	15.71	15.86
	SD	4.48	4.03		4.11	4.53	

Table 3a

Mean Total Points According to Story, Grade, and Test

| | A Boy, A Dog, and A Frog | |
Grade	Comprehension	Detail
Preschool	26.72	27.96
Kindergarten	31.55	28.98

| | Whiskers' Adventure | |
Grade	Comprehension	Detail
Preschool	29.54	28.38
Kindergarten	32.38	30.98

Table 3b

Mean of Total Points According to Story, Time and Test

	A Boy, A Dog, and A Frog	
Test	Immediate	Delayed
Comprehension	14.98	14.02
Detail	13.72	14.74
	Whiskers' Adventure	
Test	Immediate	Delayed
Comprehension	15.33	15.43
Detail	14.54	15.19

Table 4

Means and SDs of Total Points According to Grade, Story
Presentation, Test, and Time

Test		Preschool			Kindergarten		
		Imm	Del	Tot	Imm	Del	Tot
Inference Inducing Story Questions							
Comp	M	29.92	27.23	28.58	31.71	33.08	32.39
	SD	4.77	5.29		8.15	7.94	
Detail	M	27.85	30.08	28.96	29.21	32.57	30.89
	SD	5.01	5.52		6.95	6.77	
Detail Story Questions							
Comp	M	30.15	29.46	29.81	32.86	33.21	33.04
	SD	8.02	5.36		4.69	5.99	
Detail	M	28.69	29.54	29.12	27.71	29.57	28.64
	SD	7.87	6.59		5.62	6.81	
No Story Questions							
Comp	M	27.08	24.92	26.00	29.86	31.07	30.46
	SD	6.36	7.01		7.71	8.53	
Detail	M	25.92	26.77	26.35	30.00	30.79	30.39
	SD	7.81	7.13		7.62	9.29	

Table 5

Means of Total Number Correct According to Time, Test and
Grade

	Immediate	
Grade	Comprehension	Detail
Preschool	18.43	18.29
Kindergarten	19.98	19.71
	Delayed	
Grade	Comprehension	Detail
Preschool	17.21	18.26
Kindergarten	20.33	19.43

Table 6

Correlations within each Combination of Grade, Story
Presentation, and Test between Story Questions Scores and
the Test Scores

Story Cond.	Preschool						
	Comprehension				Detail		
	Imm	Del	Tot		Imm	Del	Tot
IIQ	.480	.175	.345		-.197	-.185	-.199
DQ	.415	.074	.300		.730**	.693**	.714**
Difference(Z)	.185	.253	.144		2.57**	2.25*	2.52*
	Kindergarten						
IIQ	.794***	.591*	.725*		.618**	.693**	.680*
DQ	.684**	.696**	.695**		.670**	.661**	.695**
Difference(Z)	.58	.423	.141		.211	.153	.068

Note. * $p < .05$ ** $p < .01$ *** $p < .001$.

Table 7

Correlations between Performance on the Comprehension and

Detail Tests for each Grade and Story Presentation Condition

	Preschool		
Story Cond.	Immediate	Delayed	Total
IIQ	.2495	.195	.1549
DQ	.6228**	.3719	.5544
NQ	.5880	.7501**	.6945**

	Kindergarten		
Story Cond.	Immediate	Delayed	Total
IIQ	.7916***	.8169***	.8794***
DQ	.4245	.4398	.4902
NQ	.6987**	.9227***	.9124***

Note.   * p<.05   ** p<.01   *** p <.001.

Table 8

<u>Number of Participants with Conditional Probability Higher</u>

<u>for:</u>

Grade	Comprehension >	Detail >	Equal
Preschool	9	30	3
Kindergarten	18	23	1

<u>Note</u>.

a.Conditional Prob.=

    # of Spont. Correct on Delayed   Spont. Correct on Immediate

                   Total Spont. Correct on Immediate

b. Preschool $Z= 30-(39)(.5)/ (39)(.5)(.5) = 3.36$, $p<.01$.

c. Kindergarten $Z=.23-(41)(.5)/ (41)(.5)(.5) = .7808$, $p>.05$

Figure 1

Test Performance by Time, Grade, and Test