ABSTRACT

INFERENCING SKILLS OF THIRD, FOURTH AND FIFTH GRADE STUDENTS

By Megan Marks Wagner

Inferencing skills are considered an important component in academic development because it allows students to use prior knowledge of a subject to help them learn and understand subjects. The purpose of this study was to determine patterns of third, fourth and fifth grade students’ inferencing skills. Forty-seven school children from a school district in Southwestern Ohio participated in this investigation. Each participant was administered four passages, two fiction and two non-fiction. Students were categorized by their logical thinking skills, clue selection, and inferential abilities. Responses were transcribed and evaluated independently by the primary investigator and a certified speech-language pathologist. Results indicated that students’ logical thinking and clue selection abilities were collectively significant in predicting the inferential abilities of children 8.0 through 11.0 years. Students’ present grade level and reading level were also significant in predicting students’ inferential abilities.
INFERENCING SKILLS OF THIRD, FOURTH AND FIFTH GRADE STUDENTS

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TABLE OF CONTENTS

Chapter I: Introduction........................................................................................................ 1

    Inferencing .............................................................................................................. 1
    Inferential Skills and Learning ............................................................................... 1
    Inferencing in the Educational Setting ................................................................... 1
    Influences on Inferencing Skills ............................................................................. 3

        Reading Abilities and Comprehension............................................................ 4

    Development of Inferencing Abilities................................................................. 4

    Statement of the Problem ....................................................................................... 4

    Purpose of the Study ................................................................................................ 5

    Significance of the Study......................................................................................... 5

    Chapter Summary ................................................................................................... 5

Chapter II: Literature Review ............................................................................................. 7

    Inferencing Development ....................................................................................... 7

        Reading Comprehension .................................................................................... 7

        Processes Involved in Comprehension ............................................................. 9

        Reading Abilities ............................................................................................ 9

        Inferencing Abilities ........................................................................................ 12

        Types of Inferences ........................................................................................... 12

        Inference or Prediction ....................................................................................... 12

    Educational Expectations on Inferencing Skills ................................................ 12

        Kindergarten ..................................................................................................... 13

        First Grade ....................................................................................................... 13

        Second Grade .................................................................................................. 13

        Third Grade ..................................................................................................... 13

        Fourth Grade .................................................................................................... 13

        Fifth Grade ....................................................................................................... 14

    Speech-Language Pathologists Role in Inferencing .......................................... 14

        Assessment of Inferencing Abilities .................................................................. 15

        Instructional Implications for Speech-Language Pathologists ....................... 16

        Methods for Treatment of Inferencing Deficits ............................................... 16
Chapter Summary ............................................................................................................. 17

CHAPTER III: Methods and Procedures ........................................................................... 18

Participants ..................................................................................................................... 18

   Inclusion Criteria and Participant Population .......................................................... 18

   Confidentiality of Records ....................................................................................... 18

Procedures ....................................................................................................................... 18

   Assessment Tools ...................................................................................................... 18

   Inference and Logical Thinking Skills ....................................................................... 19

   Clue Selection ........................................................................................................... 20

   Inferential Thinking Abilities .................................................................................... 21

Research Questions ........................................................................................................ 22

Null Hypothesis ............................................................................................................... 22

Data Analysis .................................................................................................................. 23

Chapter Summary ......................................................................................................... 23

CHAPTER IV: Results ...................................................................................................... 24

Demographics .................................................................................................................. 24

   Participants .................................................................................................................. 24

   Testing Procedures .................................................................................................... 24

Inferential Statistics for Research Questions .................................................................. 26

Chapter Summary ......................................................................................................... 33

CHAPTER V: Discussion .................................................................................................. 34

Predictor Variables for Inferencing Abilities ................................................................. 34

   Inferencing Development ......................................................................................... 34

   Effects of Reading Ability on Inferencing Abilities .................................................. 40

   Effects of Educational Implications on Inferencing Abilities .................................. 40

   Effects of Fiction versus Non-Fiction on Inferencing Abilities ................................. 41

   Role of Speech-Language Pathologists and Classroom Teachers on Inferencing Abilities .................................................................................................................. 41

Conclusions ..................................................................................................................... 42

Limitations ....................................................................................................................... 43

Implications for Further Research ............................................................................... 43
LIST OF TABLES

1. Inference and Logical Thinking................................................................. 20
2. Clue Selection Rating ............................................................................. 21
3. Inferential Thinking Abilities ................................................................. 22
4. Descriptive Statistics by Grade Level of Clue Selection and Logical Thinking
   Skills of Fiction and Non-Fiction Passages .............................................. 25
5. Descriptive Statistics of Third Grade Reading Levels.............................. 25
6. Descriptive Statistics of Fourth Grade Reading Levels.............................. 26
7. Descriptive Statistics of Fifth Grade Reading Levels.............................. 26
8. Difference between Fiction and Non-Fiction Clue Selection Scores .......... 29
9. Difference between Fiction and Non-Fiction Logical Thinking Scores ....... 30
10. Overall Type of Inferential Thinker on Fiction Passages ......................... 31
11. Overall Type of Inferential Thinker on Non-Fiction Passages ................... 32
12. Difference between Fiction and Non-Fiction Clue Selection Scores of High,
    Average, and Low Reading Abilities....................................................... 33
13. Difference between Fiction and Non-Fiction Logical Thinking Scores of High,
    Average, and Low Reading Abilities....................................................... 33
LIST OF FIGURES

1. Simple Correspondence Analysis of Overall Type of Inferential Thinker for Fiction Passages
   ........................................................................................................................................ 27

2. Simple Correspondence Analysis of Overall Type of Inferential Thinker for Non-Fiction Passages
   ........................................................................................................................................ 28
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CHAPTER I

Introduction

Inferencing

Inferencing consists of one’s ability in using nonlinguistic information for comprehending a linguistic utterance (Carrow-Woolfolk, 1999). Both oral and written language use inferences frequently, and cannot be comprehended without the use of inferencing skills. Inferencing is defined as drawing conclusions or making decisions, usually about something that is already known or given (Carrow-Woolfolk, 1999). According to Keene and Zimmerman (1997), inferring is going beyond the literal text, making it personal and three-dimensional, and weaving it into our own stories. Keene and Zimmerman (1997) also state when reading, the limits of the literal text is enhanced by using past experiences and beliefs, new interpretations of the text is created. Inferencing is a skill that is used in everyday life as well as in the educational setting.

Inferential Skills and Learning

Inferencing is a skill that begins developing early in life. This is evident beginning with infancy when infants’ prior experiences are constantly being compared to the present. Similarities and differences based on their prior knowledge are used to judge the familiar and the unfamiliar individuals in their life. Hansen (1981) describes an example of when an infant’s mother consistently feeds the child; the infant becomes confused when someone else tries to feed them. Over time, the new person who feeds the infant becomes more familiar to the infant. The infant uses their prior experiences of the new feeder, and accepts this new person as a provider. When a third person tries to feed the infant, he or she will most likely be accepted more readily than the second due to the infant inferring common qualities of the person more quickly.

Children infer daily, even when they are not attending school. As children grow and start experiencing new situations they are actively trying to decipher events in their environment by inferring similarities and differences of each new event (Hansen & Pearson, 1983).

Inferencing in the Educational Setting

The ability to draw inferences is a crucial factor in a child’s ability to comprehend both everyday and educational material. Drawing inferences requires the reader to expand
on what is stated in the text. Readers must use prior knowledge of different experiences
and situations, in combination with clues found in the text to reach conclusions that are
important in understanding the underlying meaning of read material (McCormick & Hill,
2001). Inferencing can be described as “central to the overall process of comprehension”
(Anderson & Pearson, 1984, pg. 269). Inferring is a strategic process in which one
generates assumptions, makes predictions, and comes to conclusions based on the given
information (Richards & Anderson, 2003). Without the ability to draw inferences,
children may fall behind their peers in regards to understanding appropriate age level
curriculum. These students do not grasp the concept of using prior knowledge to figure
out what text is implicating. Students have difficulty throughout their educational
experience when inferencing abilities are not fully developed. Students are unable to
answer questions that require further thought and imagination than what the text
implicitly states (Hansen, 1981).

Children infer in school every day. For example, when the teacher says, “Eyes up
here,” this simple statement signals the student to put their pencil down and look up at the
teacher for the next instruction. If a child does not grasp the concepts of inferencing, they
will not know what “eyes up here” means, causing them to be at a disadvantage
compared to the other students. The ability for students to draw inferences is expected to
develop throughout the elementary school years. According to the Ohio Academic
Content Standards (Ohio Department of Education, 2005), students are expected by the
end of grade three to make inferences regarding events and possible outcomes from
information in the text. Fourth grade students are expected to make inferences or draw
conclusions about what has been read, and support those conclusions with textual
evidence. By grade five, students should be making inferences based on implicit
information in texts, and provide justifications for those inferences. As students progress
through their education, they are expected to use more and more prior knowledge to help
draw conclusions about the text information.

Many teachers and speech-language pathologists (SLP) report that students in
their classroom and those receiving extra services are unable to deduce thoughtful correct
inferences. According to Richards and Anderson (2003), this is evident when students
cannot generate inferences naturally and spontaneously. They can usually infer
information from one segment of the text, but fail to integrate it with implied information in other parts of the story. This can be due in part to text constraints such as syntactic or vocabulary difficulties (Dewitz & Dewitz, 2003). Students’ underdeveloped reasoning abilities, lack of prior knowledge, and or overdependence of prior knowledge causes them to invent plausible but inaccurate answers, which may create barriers in comprehension (Anderson & Pearson, 1984; Dewitz & Dewitz, 2003; Neuman, 1990; Suh & Trabasso, 1993).

Teachers and SLPs often perceive that students in their classroom and caseload are not explicitly being taught to learn textual information by simply relating it to something they already know, but are being taught to learn new information through memorization (Hansen & Pearson, 1983). Inferencing skills of most primary grade students are not well developed. This may cause a problem for students as they enter the intermediate grade levels. Intermediate grade teachers complain that students have not satisfactorily developed the skills to draw inferences (Hansen, 1981). Students must be taught how to infer at an early age in order to take full advantage of text and clues it provides. Students must learn how to use prior knowledge in order to allow connections with the text and an understanding of what exactly is meant by the message conveyed to the reader.

Improvement of inferencing skills must be done by teaching the student to apply prior knowledge of a subject to material read. In schools, more than 70% of questions asked by teachers are factual, and less than 15% are inference questions (Hansen & Pearson, 1983). If students are to learn how to use inferencing in their everyday life, these skills need to be addressed, learned, and practiced in schools in order for success.

Influences on Inferencing Skills

Inferencing abilities are influenced primarily by prior knowledge (McCormick & Hill, 2001). When a child has experience with a subject, learning becomes easier and more concrete. Without prior knowledge of a subject, students unfortunately are at a disadvantage to their peers. For example, if the text presents information about the Grand Canyon, a child who has been to the Grand Canyon prior to the lesson will be able to use his or her experience and prior knowledge to help them infer while reading and learning the material. However, a child that has no experience or prior knowledge of the Grand
Canyon, will be unable to relate his or her experiences, and may have a difficult time understanding the subject. Therefore the amount of prior knowledge a child sustains is critical to how successful use of inferential skills.

**Reading Ability and Comprehension**

Inferencing abilities can be inhibited due to low reading ability and comprehension (Beers, 2002). The ability to read and comprehend the text is vital to students’ success with inferring. According to Davis and Lass (1996), “critical reading is an essential part of comprehending. It occurs as readers evaluate what is read in the context of their experiences and/or external standards. As readers meet new information they accept or reject its validity” (pg. 98) based on their prior knowledge. Davis and Lass (1996) continue to explain that students need adequate background knowledge about the material they are reading. If they have no cognitive structure against which to verify or negate new material, it is usually accepted at face value. Critical reading skills allow students to think about the text and use prior knowledge to infer information from the reading.

**Development of Inferencing Abilities**

Inferencing abilities begin developing at birth. Children use inferencing during everyday situations. Inferencing should continue to be taught and facilitated during the educational experience. According to Hansen (1981), inferencing skills should be a main focus of educators. Development of skills at an early age increases the ability of young children to think inferentially, and lead students to enter the intermediate grades with better comprehension skills. The Ohio Academic Content Standards (2005) outlines when typically developing students’ inferencing skills should be learned. Educators need to ensure their students have obtained skills to meet these standards.

**Statement of the Problem**

Inferential abilities directly affect students’ abilities to succeed in everyday life and in the educational setting. Inferencing is a major component throughout the curriculum. Unfortunately, there are variations between teachers on how much this skill is directly taught in the classroom. Unfortunately this may impact students’ learning potential. If students do not learn to infer, students will be at an academic disadvantage. These students need intervention from the school SLP and classroom teacher to help
them learn these crucial and necessary skills. Intervention is necessary in order to provide students with the appropriate inferencing skills which are imperative in everyday life and in the educational setting.

**Purpose of the Study**

The purpose of this study is to determine if students’ inferencing abilities are evident, and to establish a pattern through which inferencing skills are developed. Knowledge of students’ inferencing patterns will allow classroom teachers as well as SLPs to identify students’ inferencing deficits and aid in the development of tools for intervention. Intervention will assist students from falling behind peers in educational and everyday settings. The passages and rubrics developed are a diagnostic tool that will indicate the breakdown of students’ clue selection and logical thinking abilities when making inferences. This tool will allow SLPs to base their intervention methods on the areas students’ breakdown in. Fiction and non-fiction passages were used in this study to investigate if patterns existed between imaginary information and facts. Throughout school students are expected to comprehend information as the teacher reads aloud. This diagnostic tool also gives information about whether the student is able to comprehend information as it is read aloud. This information is pertinent to teachers and SLPs because other deficits may be present if decreased comprehension levels are present.

**Significance of the Study**

Inferencing abilities have implications in a student’s overall success as a learner in the educational process. Poor inferencing abilities have ramifications that can be seen throughout childhood. Documentation of patterns of students’ inferencing ability and growth will provide educators and interventionists with the knowledge and awareness necessary to target those students at-risk. With this information, children who are at-risk can be targeted and necessary intervention plans can be implemented.

**Chapter Summary**

In this chapter, the subject of inferencing was introduced and explained in relation to children’s abilities to use these skills in everyday situations and in educational settings. An overview of inference skill acquisition and factors affecting use of inference skills were discussed. The purpose of the study is to determine patterns of third, fourth, and
fifth grade students’ inferencing abilities, to know when appropriate intervention is needed by the classroom teacher and/or SLP.
Inferencing Development

Development and acquisition of inferencing skills is a gradual process that occurs over time while new experiences are encountered, and vary based on the experiences in a child’s life. Differences in development can become hurdles if some students fail to continuously acquire inferencing skills. Certain academic requirements in reading abilities and reading comprehension play a key role. Without development of critical language and literacy components, inferring becomes difficult, even if prior experiences exist. Furthermore, inferencing skills are supposed to be acquired and learned throughout the early educational years. Students are expected, according to the Ohio Academic Content Standards (2005), to be developing or have reached certain inferencing milestones throughout grades three through five.

Reading Comprehension

Inferencing abilities hugely impact the ability for students to interpret everyday communication and pragmatic skills. It also impacts students’ ability to comprehend what is being read. For example when a story states “The boy said with a wink,” the listener and/or reader are expected to be able to interpret what the boy means when he winks. They are to be able to infer that the boy is not telling the truth or that he is flirting with another character. In order for reading comprehension success, students must be able to infer.

The purpose of reading is comprehension. Correct word identification without an accompanying understanding of the author’s message is pointless (McCormick & Hill, 2001). Reading comprehension is both a product and a process; it requires purposeful strategic effort on the reader’s part. Beers (2002) outlines what strategies readers use to comprehend texts. These include “anticipating the direction of the text, or predicting, seeing the action of the text, visualizing, contemplating and then correcting whatever confusions we encounter, clarifying, and connecting what’s in the text to what’s in our mind to make an educated guess about what’s going on, inferencing” (p. 45-46). Students often fail at comprehension of text because they cannot make an inference (Beers, 2002).
One prominent theory of the cause of reading comprehension difficulties is that children have particular difficulty making inferences (Yuill & Oakhill, 1991). Bowyer-Crane and Snowling (2005) state students’ understanding of the text seems to be literal. Students do not go beyond the words on the page, and do not actively develop integrated mental representations of what they read.

Suh and Trabasso (1993) state while readers try to comprehend text, readers make representations of the text which requires integration of information across sentences. This integration is achieved by the reader linking the text to relevant knowledge and experiences. In order for a reader to comprehend texts, inferences are made. Inference use for increased text comprehension is inherently done by readers.

Think-aloud is a tool that readers use while reading. This involves thinking out loud while reading. This provides valuable information to teachers, SLPs and researchers regarding the strategies that young readers use as they attempt to comprehend the text (Leslie & Caldwell, 2000). Readers using think-aloud were found to paraphrase text, make inferences, isolate important information, monitor understanding or lack there of, react personally to the information, integrate various parts of the text, and move beyond the literal meaning of the text in an attempt to interpret what is being read (Pressley & Afflerbach, 1995). Myers, Lytle, Palladino, Devenpeck and Green (1990) found significant correlations between comprehension scores and the types of think-aloud comments made by third and fourth grade students. Those who constructed more inferences and verbalized revisions of prior knowledge understood the information better.

Critical and literal reading is an essential part of comprehending text. Critical reading occurs as readers evaluate what is being read in the context of their experiences (Davis and Lass, 1996). Literal reading requires the reader to deal with facts and inferential comprehension. Both critical and literal reading require the student to have adequate background knowledge about the material being read, or it is not learned efficiently (Davis and Lass, 1996). McCormick and Hill (2001) indicate that students experience more “difficulty with higher order comprehension, such as making inferences, than with literal level comprehension for which they must merely understand the facts directly stated in the text” (p. 219).
Processes Involved in Comprehension

As readers construct meaning from the text read, the reader integrates new knowledge derived from the text with his or her background knowledge in a way that makes sense to them. Wade (1990) investigated the use of think-alouds to assess comprehension skills of 52 students. Think alouds are individual’s verbal self-reports about their thinking process. Think-alouds allow researchers to obtain information about how students construct meaning from the text. Passages were given to each participant with predetermined segments where participants would stop and say aloud everything that came to mind after reading the passage segment. Only indirect cues were given to participants to elicit information when necessary. Passages were selected and or written prior to testing to ensure readers did not know the topic content until they saw the last segment of the passage.

Results revealed five different categories of student comprehension based on their think-aloud responses. These include the good comprehender, the non-risk taker, the non-integrator, the schema imposer, and the story teller. Good comprehenders are interactive readers who construct meaning and monitor comprehension. Good comprehenders tend to draw on background knowledge and make reasonable inferences about the passages. The non-risk taker takes a passive role by failing to go beyond the text to develop a hypothesis. Non-risk takers may look for cues from the examiner, not the text, and may frequently respond with “I don’t know”. The non-integrator draws on text clues and prior knowledge, and new hypotheses are developed for every segment of the text. The story teller draws far more on prior knowledge and experience than on information stated in the text.

Reading Abilities

A number of studies have shown that recognizing inferred information is more problematic for below-average readers than for average readers (Crais & Chapman, 1987; Oakhill, 1984). Reading abilities of individuals directly affect inferencing skills. According to Wade (1990), reading is a complex process that “involves reasoning and problem solving rather than simply the accumulation of skills” (p. 442). Leslie and Caldwell (2000) found evidence of skilled readers; those with higher levels of prior knowledge understood and comprehended the text better and more accurately than poorer
readers struggling with unfamiliar text. Zwaan and Brown (1996) found skilled readers make more explanatory inferences as they attempt to integrate information across the text.

Inferential reading skills of most young students are not well developed. Students often hesitate when confronted with questions that can be answered only when reading beyond the lines (Hansen, 1981). The ability to draw inferences appears to be less developed in disabled readers (McCormick and Hill, 2001). Proficient readers infer implicit information from the text and create meaning based on this information. Non-proficient readers cannot create this meaning based on the text, and often will have difficulty comprehending what is read (Harvey and Goudvis, 2000).

Wilson (1979) investigated the processing strategies of average and below average readers answering factual and inferential questions with three equivalent passages. Results indicated that inferential questions were significant predictors of differences of performance between average and below average readers.

Hansen and Pearson (1983) conducted a study on improving inferential comprehension of good and poor fourth-grade readers. Good and poor readers were separated into four groups. The experimental group and control group had two groups, good readers and poor readers. Teachers who conducted the experimental group were instructed on how to teach their class inferencing skills and were provided activities to complete on inferencing two out of five days per week. The control group continued with classes as normal. The study was conducted for ten weeks. Results indicated that when direct instruction in inferential thinking was provided, the poor readers learned it and used it to their advantage. Good readers did not benefit as much as the poor readers from the specific instructional inferencing classes.

McCormick and Hill (2001) reduplicated Hansen and Pearson’s (1983) previous study, using similar procedures, and analyzed the effects of two procedures for increasing fifth-grade disabled readers’ inferencing skills. This new study differed from Hansen and Pearson’s by including disabled readers. The purpose of the study was to investigate different techniques to increase inferencing skills of 80 fifth-grade disabled readers. The results indicated direct instruction improved inferencing comprehension techniques among fifth-grade students with disabilities.
**Inferencing Abilities**

Inferring is the bedrock of comprehension, reading, and everyday life (Harvey & Goudvis, 2000). According to Harvey and Goudvis (2000), inferences are made daily about expressions, body language, tone of voice, as well as read text. When one infers, they draw conclusions based on clues in the text or situation, make predictions before and during reading, use implicit information from the text to create meaning during and after reading, and use pictures to help gain meaning. These skills are crucial for students to learn and utilize for successful comprehension of texts.

Harvey and Goudvis (2000) state that inferential thinking occurs when text clues merge with the reader’s prior knowledge and questions to point toward a conclusion about an underlying theme or idea in the text. If readers do not infer they will not grasp the deeper meaning of the texts. Readers’ questions are often only answered through an inference, therefore the more information readers acquire, the more likely they will make an inference that is correct.

Several studies have investigated inferencing skills of students, and reported that teaching inferencing skills to school aged children is important for further educational success. Hansen (1981) conducted a study on second grade students’ inference comprehension strategies. Students were split into two groups, experimental and control. The experimental group received special instructions on how to use prior knowledge to help make inferences about the story. The control group was taught the suggested lesson in the teacher’s manual on story comprehension. After ten days, students were asked comprehension questions including, two inferential questions. The experimental group scored significantly better on the inferential questions than the control group.

Neuman (1990) analyzed 42 fifth grade students’ inferencing strategies. Students were instructed to read two non-fiction mystery stories containing six stopping points which directed the student to stop reading. At these predetermined stopping points, the examiner would ask questions to discover the students’ inferencing patterns. These questions include (a) Did you find any clues in your reading? (b) What do you think will happen next? Why do you think so? (c) Does this give you any ideas? Results indicated that subjects used eight different inferencing strategies throughout the study. Inferencing occurred during the encoding process, as children were interpreting incoming data.
Types of Inferences

Two main types of inferences exist. Causal inferences require the reader to infer the antecedent or consequences of an action (Richards & Anderson, 2003). For example, Lori did not feel well. She had eaten seven hamburgers, two cookies, and one ice cream cone at the school carnival. The previous example was a causal inference, because the reader must conclude that Lori felt ill because she ate a large amount of food.

Another type of inference is relational inferences. This type requires the reader to integrate information across sentences (Richards & Anderson, 2003). For example, Danny sat at the kitchen table working on his English homework. He could hear his favorite show on the TV. Danny sighed and got to work. The previous example was a relational inference, because the reader concludes that the TV was not in the kitchen, and Danny wanted to watch his favorite TV show instead of finishing his homework. These two types of inferencing occur in everyday life, and are important for students to learn how to apply in everyday situations.

Inference or Prediction

Inferring and predictions are often confused by students because they are very similar, but different. Predicting is related to inferring, but we predict outcomes, events, or actions that are confirmed or contradicted by the end of the story. Inferences often remained unresolved until the end of the story, and are often open-ended (Harvey and Goudvis, 2000). It is important for educators to distinguish the difference between these two terms. Students need to learn and understand how to use both when reading and understanding texts.

Educational Expectations on Inferencing Skills

Most states require educators to administer assessments to determine academic success of their students. These assessments mostly focus on critical thinking skills, which encompass inferencing. In order for critical thinking to occur, the student must use inferencing. It is important for educational curriculum to focus on teaching critical thinking skills of students, as well as inferencing.

According to the Ohio Academic Content Standards (OACS) (2005), students’ inferencing skills should be an ongoing development. Throughout students’ educational experience developing and learning to apply strategies, such as predicting and
inferencing, helps students to comprehend and interpret informational and literal text (OACS, 2005). OACS provides a set of clear and rigorous expectations for all students and clearly defines what students should be able to do as they progress through school. States nationwide such as New York and California have the same expectations and requirements of their students. For the purpose of this study, only the Ohio Academic Content Standards were analyzed in-depth, but it should be noted that these are similar across the United States.

Kindergarten

As students’ complete kindergarten, it is expected for them to begin to compare information in texts using prior knowledge and experiences, or inferencing. This is one of the first steps students must learn and understand in order to learn how to use their prior knowledge to make sense of what is read (OACS, 2005).

First Grade

Throughout grade one student’s should be continuing to make predictions while reading, and support predictions with information from the text or prior experience. Students should be comparing information in texts with prior knowledge and experiences, answering simple inferential and evaluative questions to demonstrate grade-appropriate print texts (OACS, 2005).

Second Grade

Students in second grade should be predicting content, events, and outcomes from illustrations and prior experience and support these predictions with examples from the text or background knowledge by second grade. Comparing and contrasting information throughout texts by using prior knowledge and experiences should be developing. Comprehension of grade-appropriate print texts should also be developing and mastered in some students by completion of inferential questions (OACS, 2005).

Third Grade

Students should be making inferences regarding events and possible outcomes from information in the text by grade three. Students should also be able to answer inferential questions to demonstrate comprehension of grade-appropriate print texts (OACS, 2005).
Fourth Grade

By the completion of grade four students are expected to be making inferences and draw conclusions about what has been read and support those conclusions with textual evidence. Students should also be answering inferential questions to demonstrate comprehension of grade-appropriate print texts (OACS, 2005).

Fifth Grade

Students should be inferring and drawing conclusions based on implicit information in texts, and provide justifications for those inferences by completion of grade five. Students should also be answering inferential questions to demonstrate comprehension of grade-appropriate print texts (OACS, 2005). Educators expect students after grade five to understand inferencing and how to apply it to comprehension of text. Students in sixth grade will not be explicitly taught how to utilize inferential skills.

Speech-Language Pathologists Role in Inferencing

According to the American Speech-Language-Hearing Association (ASHA) (1990), speech-language pathologists’ (SLP) role is to serve those persons with language impairments. ASHA (1990) states that “language impairments include those of receptive and expressive language in both its spoken and written forms, as well as gestural expression and reception” (pg. 313). School-based speech-language pathologists role according to ASHA (1999) is to remediate, ameliorate, or alleviate student communication problems within the educational environment. Therefore, the role of the school SLP is to help students succeed academically and to be an integral part of the intervention team. The intervention team works together to plan and develop appropriate intervention techniques and goals for each student. This intervention may be through many avenues, including students’ with language impairments.

Speech-language pathologists (SLP) often work with individuals with language needs that focus on development of inferential skills. Students’ prior knowledge of information and concepts allows new learning to be facilitated in the classroom. If the prior knowledge and/or concepts are not learned, the student will not comprehend classroom material. These students may need help in the areas of reading and language comprehension as well as semantics (Merritt & Culatta, 1998).
If students present with reading and language comprehension deficits, they may exhibit decreased vocabulary and inferencing skills. According to Crais and Chapman (1987), students who have poor vocabulary comprehension skills have poor story comprehension which influences their inferencing abilities. Inferencing cannot occur unless vocabulary in the text is comprehended by the reader or listener. SLPs and classroom teachers need to build students’ vocabulary skills in order to increase text comprehension. If text comprehension does not take place students will not be able to infer, even if prior knowledge is present.

**Assessment of Inferencing Abilities**

To assess students’ inferencing abilities SLPs may give the Comprehensive Assessment of Spoken Language (CASL). The CASL is an in-depth, research based, theory driven assessment of spoken language. It provides a thorough assessment of language processing skills, and provides clinicians with a precise picture of the student’s deficits in language processing. Inferencing abilities of students’ ages 7 thru 17 are tested using the CASL. The inference test assesses students’ abilities to integrate, through inferencing, appropriate world knowledge from the information provided by messages spoken by the examiner. The passages are taken from everyday experiences of most children and are arranged according to difficulty with regards to the episode presented in the passage and the linguistic expression used (Carrow-Woolfolk, 1999). Students who perform poorly on the CASL are viewed as lacking in at least some of the world knowledge that is possessed by others at the same age level. If scores from the test are poor, increasing world knowledge, as well as language and reading comprehension should be addressed (Carrow-Woolfolk, 1999).

Although the CASL assesses inferencing skills of students, it does not have a diagnostic component. Each inferential question on the CASL consists of a short statement followed by one question to the student. Answers are scored and used to assess students’ inferencing skills. This method of assessing inferencing skills does not allow test examiners to see a pattern of inferencing abilities, it does show how students develop their answers (logical thinking skills) and does not indicate what clues make them answer the way they do.
Instructional Implications for Speech-Language Pathologists

According to Wade (1990) understanding whether and how students use their background knowledge in constructing meaning from text and whether they monitor their comprehension has important implications for instruction. Strategies that may be effective for one type of comprehender may not be effective for another. For strong comprehenders, strategies should focus on their strong comprehension abilities. Intervention strategies for non-risk takers should focus on developing and using prior knowledge to enhance understanding. Non-risk takers may also need instruction on linking ideas together to form coherent understanding of text (Wade, 1990). Individuals who draw more on prior knowledge than on textual information need intervention to focus on strategies that emphasize cognitive flexibility and comprehension monitoring (Wade, 1990). These individuals would be categorized as schema imposers or personal storytellers. Wade (1990) suggests SLPs should focus intervention on encouraging readers to entertain alternate interpretations and multiple perspectives when presented with the text.

Methods for Treatment of Inferencing Deficits

Carrow-Woolfolk (1999) states “if children lack necessary world knowledge for making inferences, they will fail to understand much of the language around them as well as fail to comprehend much of what they read” (pg. 63). It is important for SLPs to increase students’ world knowledge. SLPs must also aid in students’ comprehension skills of text. To facilitate this skill SLPs should model to students how to reason, make assumptions, and come to conclusions from the text (Hansen, 1981; Hansen & Pearson, 1983; Mantione & Smead, 2003; Raphael & Wonnacott, 1985).

SLPs can also use the think-aloud method: thinking aloud while reading to increase inferencing abilities of students. Laing and Kamhi (2002) state that the think-aloud procedure helps the reader to identify causal ties in the text. Understanding these ties aids students in text comprehension and contributes to the development of inferencing skills. SLPs may also assist the student in reading passages to help the student identify implicit clues which aid in inferring the outcome of passages.
Chapter Summary

This chapter provided a description and explanation of inferencing development, and how this development is impacted by reading comprehension and abilities. Different types of inferencing were discussed as well as the educational expectations on inferencing development from kindergarten through fifth grade. The speech-language pathologists’ role in inferencing development was also discussed.
CHAPTER III
Methods and Procedures

Participants

Inclusion Criteria and Participant Population

This study was conducted at a rural elementary school in Southwestern Ohio. A total of forty-seven male and female elementary school students from third, fourth, and fifth grade classrooms participated in the study. All participants ranged in age from 8 years, 0 months to 11 years, 0 months. Each classroom had an enrollment of more than twenty students. All students in the classroom were asked to participate. Participants were not chosen based on academic competency, but were selected based on returned permission forms. Parental and participant consent was required from all students who participated in the study. All participants spoke English as their first language.

Confidentiality of Records

Initial contact was made with school administrators and personnel to ensure compliance with the study. Participants were each given a number code to ensure confidentiality of their records. Each participant was referred to by this number throughout the study. Data was stored in locked files, with the identifying information and data stored separately. Only the faculty advisors and researcher had access to those files.

Procedures

The parents of students in third, fourth, and fifth grade classrooms were given a consent form (Appendix A) explaining the study’s purpose and the expectations of the participant. A brief synopsis of the study was given as well as a returned consent form to all children in participating third, fourth and fifth grade classrooms. Parents were assured of data confidentiality. Once permission of each student was obtained, testing dates were set up with classroom teachers and the school speech-language pathologist. Every student who returned a signed permission slip was included in the study. There was no exclusion of any participants based on race, educational level, and socioeconomic status.

Assessment Tools

Passages were created by Leslie Holzhauser-Peters, M.S., CCC-SLP, and the researcher of the study. Two fiction and two non-fiction passages were created for each
grade level (Appendix I, J, K). The passages were no more than 150 words. Each passage was submitted to The Lexile Framework for Reading (2004), which matches the appropriate grade level to each text. Each text was given a lexile score, which indicated what grade level, corresponded with each passage. Only passages that were at the participants’ appropriate grade level were given in the present study.

Participants met with the researcher during one session for approximately twenty to thirty minutes. During this session, two fiction and two non-fiction passages were read aloud to participants in a quiet environment with no distractions. Prior to beginning the study, student permission (Appendix G) was obtained. Directions and one example (Appendix H) was given to ensure understanding of what was expected of each participant. After the researcher read the directions and example, testing began. Two fiction passages were read first and then two non-fiction passages. Each passage contained specific clues to determine a pattern of the students’ inferencing abilities. Each passage had seven predetermined stopping points where the examiner would stop reading and ask the participant specific questions about the clues just given. These questions were used to detect the participant’s inferencing pattern. The questions asked are as follows: (a) what do you think this is about? (b) what clues make you think that? Responses were written down verbatim. The student was allowed repetitions of the previous read portion of the passage if requested.

Following each session the examiner rated the participants’ inference and logical thinking skills (Appendix D) and clue selection abilities (Appendix E). From these scores and the overall answers, the examiner rated the participants on their overall inferential thinking abilities.

Inference and Logical Thinking Skills

Participants were given scores based on their inference and logical thinking skills. Students’ inferencing and logical thinking skills were categorized into five groups. Each participant received a score of zero to four depending on criteria met by the participant. A score of four was given if participants made a logical inference and their thinking was logical most (75-100%) of the time. A three was given if participants made a logical inference and their thinking was logical some (50-74%) of the time. A score of two was given if the inference and logical thinking participants made was not logical some (25-
49%) of the time. A score of one was given if the students inference and logical thinking was not logical most (0-24%) of the time. If students did not attempt to make an inference or explain their logical thinking they received a score of 0. Table 1 shows the criteria the student is rated on for inferencing and logical thinking skills.

Table 1

*Explanation of Students’ Inference/logical Thinking*

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>The inference the student made and/or their thinking about why they made that guess was logical most of the time.</td>
<td>75 - 100%</td>
</tr>
<tr>
<td>3</td>
<td>The inference the student made and/or their thinking about why they made the guess was logical some of the time.</td>
<td>50 - 74%</td>
</tr>
<tr>
<td>2</td>
<td>The inference the student made and/or their thinking about why they made that guess was NOT logical some of the time.</td>
<td>25 - 49%</td>
</tr>
<tr>
<td>1</td>
<td>The inference the student made and/or their thinking about why they made that guess was NOT logical most of the time.</td>
<td>0 - 24%</td>
</tr>
<tr>
<td>0</td>
<td>Did not attempt to guess or explain.</td>
<td></td>
</tr>
</tbody>
</table>

*Clue Selection*

Participants were also given scores based on their ability to determine what clues are most important from the text. Scores of zero to four were given based on criteria met by the participant. A score of four was given if students selected significant clues most (75-100%) of the time. A score of three was given if students selected significant clues some (50-74%) of the time. Participants received a score of two if the student did not select significant clues some (25-49%) of the time. A score of one was given if the student did not select significant clues most (0-24%) of the time. Students received a zero
score if they did not try to select a clue. Table 2 shows the criteria the student is rated on for clue selection ability.

Table 2

*Clue Selection/Determining what is Important*

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Definitely selected significant clue(s) most of the time.</td>
<td>75 - 100%</td>
</tr>
<tr>
<td>3</td>
<td>Selected significant clue(s) some of the time.</td>
<td>50 - 74%</td>
</tr>
<tr>
<td>2</td>
<td>Did not select the important clue(s) some of the time.</td>
<td>25 - 49%</td>
</tr>
<tr>
<td>1</td>
<td>Did not select the important clue(s) most of the time.</td>
<td>0 - 24%</td>
</tr>
<tr>
<td>0</td>
<td>Did not try to select a clue.</td>
<td></td>
</tr>
</tbody>
</table>

*Inferential Thinking Abilities*

Based on students’ overall responses and scores on inference ability and clue selection, participants overall inferential thinking abilities were assessed. This rating scale, which was adapted from a study by Wade (1990), separates participants into five categories of inferential thinking abilities. Table 3 shows the five categories.
Table 3
Inferential Thinking Abilities

<table>
<thead>
<tr>
<th>Good Comprehender</th>
<th>The student makes inferences by integrating the clues and changing the hypothesis as needed. The student knows when more information is needed. The student keeps the clues that are significant and discards unimportant clues. The student monitors their comprehension.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Integrator</td>
<td>The student develops a new inference for each segment presented. Each segment presents new clues and the student's inference changes to match the new clues. The student does not integrate the clues.</td>
</tr>
<tr>
<td>Schema Imposer</td>
<td>The student develops their initial inference and never changes it.</td>
</tr>
<tr>
<td>Personal Storyteller</td>
<td>The student identifies with the topic of the text and wants to tell the examiner a story about what the text has made him think about.</td>
</tr>
<tr>
<td>Non-Risk Taker</td>
<td>The student lacks confidence. The student looks for clues from examiner. The student may repeat words or phrases. The student may often respond &quot;I don't know.&quot; The student gives their hypothesis using a questioning intonation.</td>
</tr>
</tbody>
</table>

Research Questions

1. Participants’ overall inferential thinking abilities will show a pattern.
2. Clue selection will not be affected by the use of fiction versus non-fiction passages.
3. Logical thinking skills will not be affected by the use of fiction versus non-fiction passages.
4. Inferential thinking abilities will not be affected by the use of fiction versus non-fiction passages.
5. Fiction and non-fiction passages will not affect students’ clue selection and logical thinking abilities based on their reading level.

Null Hypothesis

1. Participants’ overall inferential thinking abilities will not show a pattern.
2. Clue selection will be affected by the use of fiction versus non-fiction passages.
3. Logical thinking skills will be affected by the use of fiction versus non-fiction passages.
4. Inferential thinking abilities will be affected by the use of fiction versus non-fiction passages.
5. Fiction and non-fiction passages will affect students’ clue selection and logical thinking abilities based on their reading level.

Data Analysis

Groups were categorized, and the scores were analyzed using a 3-factor Analysis of Variance (George & Mallery, 2005). This was performed on the data to determine what, if any, relations resulted from categorizing participants based on the three coding categories. These categories included the participants’ ability to infer throughout the passage, participants’ ability to determine what clue was most important, and the participants’ overall inferential thinking abilities. Based on participants’ overall responses they were categorized as good or poor inferential thinkers. Inter-rater reliability was estimated by two examiners analyzing participant’s (n=10) responses and then rating appropriately. Participants’ responses were also analyzed using simple correspondence analysis of all categorical ranking systems.

Chapter Summary

In this chapter the participant sample was outlined as 47 third, fourth, and fifth grade students. Research questions and null hypothesis were addressed, and research procedures for data collection were outlined.
CHAPTER IV

Results

Demographics

Participants

Forty-seven participants were involved in this investigation. Participants were recruited from one rural elementary school in Southwestern Ohio. Participants were not chosen based on academic competency, but were selected based on returned permission forms from parents. The participants were enrolled in three different classrooms. Of the 47 participants, 29 (62%) were females and 18 (38%) were males. Participants ranged in age from 8:0 years (96 months) to 11:0 years (132 months). There were 19 participants in the third grade, 18 participants in the fourth grade, and 10 participants in the fifth grade. Appendix L shows participant demographics for all predictor variables.

Testing Procedures

Each of the participants was administered two fiction and two non-fiction passages that correspond to their grade level. Table 4 shows the descriptive statistics (mean clue selection score and mean logical thinking score) for each of the passages administered for each grade level. Descriptive statistics based on the students reading level for each passage is shown in Table 5, Table 6, and Table 7. Appendix L displays the scores for each participant for all of the passages administered.
Table 4

Descriptive Statistics by Grade Level of Clue Selection and Logical Thinking Skills of Fiction and Non-Fiction Passages

<table>
<thead>
<tr>
<th>Grade</th>
<th>Variable</th>
<th>n</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Clue Selection Fiction</td>
<td>19</td>
<td>2.39</td>
<td>1.08</td>
</tr>
<tr>
<td></td>
<td>Clue Selection Non-Fiction</td>
<td>19</td>
<td>2</td>
<td>0.97</td>
</tr>
<tr>
<td></td>
<td>Logical Thinking Fiction</td>
<td>19</td>
<td>2.5</td>
<td>1.08</td>
</tr>
<tr>
<td></td>
<td>Logical Thinking Non-Fiction</td>
<td>19</td>
<td>2.13</td>
<td>0.91</td>
</tr>
<tr>
<td>4</td>
<td>Clue Selection Fiction</td>
<td>18</td>
<td>3.38</td>
<td>0.53</td>
</tr>
<tr>
<td></td>
<td>Clue Selection Non-Fiction</td>
<td>18</td>
<td>3.19</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td>Logical Thinking Fiction</td>
<td>18</td>
<td>3.44</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td>Logical Thinking Non-Fiction</td>
<td>18</td>
<td>3.22</td>
<td>0.54</td>
</tr>
<tr>
<td>5</td>
<td>Clue Selection Fiction</td>
<td>10</td>
<td>3.5</td>
<td>0.52</td>
</tr>
<tr>
<td></td>
<td>Clue Selection Non-Fiction</td>
<td>10</td>
<td>3.5</td>
<td>0.74</td>
</tr>
<tr>
<td></td>
<td>Logical Thinking Fiction</td>
<td>10</td>
<td>3.85</td>
<td>0.24</td>
</tr>
<tr>
<td></td>
<td>Logical Thinking Non-Fiction</td>
<td>10</td>
<td>3.65</td>
<td>0.66</td>
</tr>
</tbody>
</table>

Table 5

Descriptive Statistics of Third Grade Reading Levels

<table>
<thead>
<tr>
<th>Grade</th>
<th>Reading Level</th>
<th>Variable</th>
<th>n</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>High</td>
<td>Clue Selection Fiction</td>
<td>10</td>
<td>2.75</td>
<td>1.13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clue Selection Non-Fiction</td>
<td>10</td>
<td>2.35</td>
<td>1.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logical Thinking Fiction</td>
<td>10</td>
<td>2.9</td>
<td>1.02</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logical Thinking Non-Fiction</td>
<td>10</td>
<td>2.35</td>
<td>1.05</td>
</tr>
<tr>
<td>3</td>
<td>Average</td>
<td>Clue Selection Fiction</td>
<td>7</td>
<td>2.28</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clue Selection Non-Fiction</td>
<td>7</td>
<td>1.78</td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logical Thinking Fiction</td>
<td>7</td>
<td>2.21</td>
<td>1.07</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logical Thinking Non-Fiction</td>
<td>7</td>
<td>2.07</td>
<td>0.67</td>
</tr>
<tr>
<td>3</td>
<td>Low</td>
<td>Clue Selection Fiction</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clue Selection Non-Fiction</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logical Thinking Fiction</td>
<td>2</td>
<td>1.5</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logical Thinking Non-Fiction</td>
<td>2</td>
<td>1.25</td>
<td>0.35</td>
</tr>
</tbody>
</table>
Table 6

Descriptive Statistics of Fourth Grade Reading Levels

<table>
<thead>
<tr>
<th>Grade</th>
<th>Reading Level</th>
<th>Variable</th>
<th>n</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>High</td>
<td>Clue Selection Fiction</td>
<td>2</td>
<td>3.5</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clue Selection Non-Fiction</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logical Thinking Fiction</td>
<td>2</td>
<td>3.75</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logical Thinking Non-Fiction</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>Average</td>
<td>Clue Selection Fiction</td>
<td>14</td>
<td>3.46</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clue Selection Non-Fiction</td>
<td>14</td>
<td>3.17</td>
<td>0.57</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logical Thinking Fiction</td>
<td>14</td>
<td>3.57</td>
<td>0.38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logical Thinking Non-Fiction</td>
<td>14</td>
<td>3.21</td>
<td>0.46</td>
</tr>
<tr>
<td>4</td>
<td>Low</td>
<td>Clue Selection Fiction</td>
<td>2</td>
<td>2.75</td>
<td>1.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clue Selection Non-Fiction</td>
<td>2</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logical Thinking Fiction</td>
<td>2</td>
<td>2.25</td>
<td>1.76</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logical Thinking Non-Fiction</td>
<td>2</td>
<td>2.5</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 7

Descriptive Statistics of Fifth Grade Reading Levels

<table>
<thead>
<tr>
<th>Grade</th>
<th>Reading Level</th>
<th>Variable</th>
<th>n</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>High</td>
<td>Clue Selection Fiction</td>
<td>4</td>
<td>3.37</td>
<td>0.47</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clue Selection Non-Fiction</td>
<td>4</td>
<td>3.87</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logical Thinking Fiction</td>
<td>4</td>
<td>3.75</td>
<td>0.28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logical Thinking Non-Fiction</td>
<td>4</td>
<td>3.75</td>
<td>0.5</td>
</tr>
<tr>
<td>5</td>
<td>Average</td>
<td>Clue Selection Fiction</td>
<td>4</td>
<td>3.37</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clue Selection Non-Fiction</td>
<td>4</td>
<td>3.37</td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logical Thinking Fiction</td>
<td>4</td>
<td>3.87</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logical Thinking Non-Fiction</td>
<td>4</td>
<td>3.87</td>
<td>0.25</td>
</tr>
<tr>
<td>5</td>
<td>Low</td>
<td>Clue Selection Fiction</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clue Selection Non-Fiction</td>
<td>2</td>
<td>3</td>
<td>1.41</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logical Thinking Fiction</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logical Thinking Non-Fiction</td>
<td>2</td>
<td>3</td>
<td>1.41</td>
</tr>
</tbody>
</table>

Inferential Statistics for Research Questions

Research Question 1: Participants’ overall inferential thinking abilities will show a pattern.

A simple correspondence analysis shows that as grade level increases so does the number of good comprehenders. A correspondence analysis is a descriptive technique designed to analyze structures and patterns of categorical variables (Greenacre, 1984). Correspondence analysis is a method for accounting for deviations of the Chi-Square
statistic by identifying a small number of dimensions that are associated. In Figure 1, 89.73% of one principal component accounts for the Chi-Square associations on dimension association. Row points that are close to each other are similar with regard to the pattern of relative frequencies across variable categories.

Results shown in Figure 1 indicate that for fiction passages good comprehenders (GC) tend to occur among fourth and fifth grade students, and non-integrators (NI), schema imposers (SI), and non-risk takers (NRT) tend to associate more with third grade students. Figure 2 indicates that for non-fiction passages, good comprehenders (GC) tend to include fifth grade students. Fourth grade students tend to associate more with a combined type of inferential thinker, non-risk takers/good comprehenders (NRT_GC) and non-integrators/good comprehenders (NI_GC). Third grade students tend to be associated more with non-integrators, non-risk takers, and non-risk takers/non-integrator (NRT_NI). These results for both fiction and non-fiction passages support the research question that overall inferential thinking abilities do show a pattern between grade levels.

Figure 1
Simple Correspondence Analysis of Overall Type of Inferential Thinker for Fiction Passages
Research Question 2: Clue selection will not be affected by the use of fiction versus non-fiction passages.

Analysis of variance (ANOVA) results are shown in Table 8. Clue selection is not impacted by fiction versus non-fiction passages for fourth and fifth grade students (p>.05). However, there is statistically significant evidence (p<.01) which indicates that third graders clue selection abilities are worse in non-fiction versus fiction passages.
Table 8

_Difference between Fiction and Non-Fiction Clue Selection Scores_

<table>
<thead>
<tr>
<th>Grade</th>
<th>Least Squares Mean</th>
<th>Standard Error</th>
<th>Pr &gt; t</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0.48</td>
<td>0.18</td>
<td>0.01</td>
</tr>
<tr>
<td>4</td>
<td>0.14</td>
<td>0.19</td>
<td>0.47</td>
</tr>
<tr>
<td>5</td>
<td>0.03</td>
<td>0.23</td>
<td>0.86</td>
</tr>
</tbody>
</table>

_Adjustment for Multiple Comparisons: Bonferroni_

_Clue Selection Data Analysis: Difference between Fiction and Nonfiction_

Research Question 3: **Logical thinking skills will not be affected by the use of fiction versus non-fiction passages.**

The ANOVA results shown in Table 9 indicate that as students progress through third, fourth, and fifth grades, there is an observed difference of students logical thinking skills in fiction and non-fiction passages. Logical thinking skills are utilized more in fiction passages than non-fiction passages for grade three (p=.05). There was not a statistical difference between fiction and non-fiction passages of students in grades four and five (p>.05) as in grade three.
Table 9

<table>
<thead>
<tr>
<th>Grade</th>
<th>Least Squares Mean</th>
<th>Standard Error</th>
<th>Pr &gt; t</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0.38</td>
<td>0.19</td>
<td>0.05</td>
</tr>
<tr>
<td>4</td>
<td>0.24</td>
<td>0.21</td>
<td>0.24</td>
</tr>
<tr>
<td>5</td>
<td>0.21</td>
<td>0.24</td>
<td>0.39</td>
</tr>
</tbody>
</table>

Adjustment for Multiple Comparisons: Bonferroni

Logical Thinking Data Analysis: Difference between Fiction and Nonfiction

Research Question 4: **Inferential thinking abilities will not be affected by the use of fiction versus non-fiction passages.**

Results from the frequency procedure shown in Table 10 and Table 11 indicate that there is a higher percentage of good comprehenders on fiction passages than non-fiction passages in grades three (fiction = 14.89%, non-fiction = 6.38%), and four (fiction = 25.53%, non-fiction = 17.02%). In fifth grade these percentages were nearly equal (fiction = 19.15%, non-fiction = 17.02%). These results indicate that fiction passages do affect students’ overall inferential thinking abilities, more so in younger students.
Table 10

*Overall Type of Inferential Thinker on Fiction Passages*

<table>
<thead>
<tr>
<th>Type</th>
<th>Grade 3</th>
<th>Grade 4</th>
<th>Grade 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good Comprehender f</td>
<td>7</td>
<td>12</td>
<td>9</td>
<td>28</td>
</tr>
<tr>
<td>%</td>
<td>14.89</td>
<td>25.53</td>
<td>19.15</td>
<td>59.57</td>
</tr>
<tr>
<td>Non-Integrator f</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>%</td>
<td>6.38</td>
<td>2.13</td>
<td>0</td>
<td>8.51</td>
</tr>
<tr>
<td>Non-Integrator &amp; Good Comprehender f</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>%</td>
<td>8.51</td>
<td>10.64</td>
<td>2.13</td>
<td>21.28</td>
</tr>
<tr>
<td>Non-Risk Taker f</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>%</td>
<td>8.51</td>
<td>0</td>
<td>0</td>
<td>8.51</td>
</tr>
<tr>
<td>Schema Imposer f</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>%</td>
<td>2.13</td>
<td>0</td>
<td>0</td>
<td>2.13</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>18</td>
<td>10</td>
<td>47</td>
</tr>
<tr>
<td>%</td>
<td>40.43</td>
<td>38.3</td>
<td>21.28</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 11

*Overall Type of Inferential Thinker on Non-Fiction Passages*

<table>
<thead>
<tr>
<th>Type</th>
<th>Grade 3</th>
<th>Grade 4</th>
<th>Grade 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good Comprehender</td>
<td>f 3</td>
<td>8</td>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td>%</td>
<td>6.38</td>
<td>17.02</td>
<td>17.02</td>
<td>40.43</td>
</tr>
<tr>
<td>Non-Integrator</td>
<td>f 11</td>
<td>1</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>%</td>
<td>23.4</td>
<td>2.13</td>
<td>2.13</td>
<td>27.66</td>
</tr>
<tr>
<td>Non-Integrator &amp;</td>
<td>f 1</td>
<td>8</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Good Comprehender</td>
<td>% 2.13</td>
<td>17.02</td>
<td>2.13</td>
<td>21.28</td>
</tr>
<tr>
<td>Non-Risk Taker</td>
<td>f 3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>%</td>
<td>6.38</td>
<td>0</td>
<td>0</td>
<td>6.38</td>
</tr>
<tr>
<td>Non-Risk Taker &amp;</td>
<td>f 0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Good Comprehender</td>
<td>% 0</td>
<td>2.13</td>
<td>0</td>
<td>2.13</td>
</tr>
<tr>
<td>Non-Risk Taker &amp;</td>
<td>f 1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Non-Integrator</td>
<td>% 2.13</td>
<td>0</td>
<td>0</td>
<td>2.13</td>
</tr>
<tr>
<td>Total</td>
<td>f 19</td>
<td>18</td>
<td>10</td>
<td>47</td>
</tr>
<tr>
<td>%</td>
<td>40.43</td>
<td>38.3</td>
<td>21.28</td>
<td>100</td>
</tr>
</tbody>
</table>

*Research Question 5: Fiction and non-fiction passages will not affect students’ clue selection and logical thinking abilities based on their reading level.*

Results from the ANOVA shown in Table 12 indicate that students clue selection scores are similar on non-fiction passages and fiction passages for students different reading levels (p>.05). Table 13 illustrates comparable results for high, average, and low reading levels using logical thinking abilities on fiction passages than non-fiction passages (p>.05).
Table 12

*Difference between Fiction and Non-Fiction Clue Selection Scores of High, Average, and Low Reading Abilities*

<table>
<thead>
<tr>
<th>Reading Level</th>
<th>Least Squares Mean</th>
<th>Standard Error</th>
<th>Pr &gt; t</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>-0.04</td>
<td>0.19</td>
<td>0.8</td>
</tr>
<tr>
<td>Average</td>
<td>0.3</td>
<td>0.15</td>
<td>0.05</td>
</tr>
<tr>
<td>Low</td>
<td>0.41</td>
<td>0.29</td>
<td>0.16</td>
</tr>
</tbody>
</table>

Adjustment for Multiple Comparisons: Bonferroni

Clue Selection Data Analysis: Difference between Fiction and Nonfiction

Table 13

*Difference between Fiction and Non-Fiction Logical Thinking Scores of High, Average, and Low Reading Abilities*

<table>
<thead>
<tr>
<th>Reading Level</th>
<th>Least Squares Mean</th>
<th>Standard Error</th>
<th>Pr &gt; t</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>0.27</td>
<td>0.2</td>
<td>0.18</td>
</tr>
<tr>
<td>Average</td>
<td>0.24</td>
<td>0.16</td>
<td>0.14</td>
</tr>
<tr>
<td>Low</td>
<td>0.33</td>
<td>0.3</td>
<td>0.28</td>
</tr>
</tbody>
</table>

Adjustment for Multiple Comparisons: Bonferroni

Logical Thinking Data Analysis: Difference between Fiction and Nonfiction

*Chapter Summary*

This chapter presented the statistical results of the data analyses. The research questions were answered with five variables (clue selection, logical thinking skills, reading level, and fiction and non-fiction passages) collectively impacting overall inferential abilities of third, fourth, and fifth grade students.
CHAPTER V
Discussion

Research has shown that several factors contribute to the development of inferencing abilities in children. These inferencing skills are developed over time as new experiences are encountered. Development of critical language and literacy components are necessary for students in order to infer. If these critical language and literacy components are not learned, inferring becomes difficult, even if prior experiences exist. Therefore, the purpose of this investigation was to determine if students’ inferencing abilities were evident, and to establish a pattern through which they develop their inferencing skills. Knowledge of students’ inferencing patterns will allow classroom teachers as well as SLPs to identify students’ inferencing deficits and aid in the development of tools for intervention.

Forty-seven participants were involved in this study. Each participant was administered two fiction and two non-fiction passages which correspond to their grade level. The students’ responses were analyzed based on their clue selection and logical thinking abilities to determine the students’ overall inferential thinking abilities.

The results of the present study demonstrated that students’ logical thinking and clue selection abilities were collectively significant in predicting the inferential abilities of children 8.0 through 11.0 years. Logically, students’ present grade level was also a predictor in their inferential abilities. Third grade students’ inferencing abilities were not as developed as fourth grade or fifth grade students, and fourth grade inferencing abilities were not as developed as fifth grade students. Students’ reading level was also found to be a predictor of inferencing skills. Students’ reading level in the high or average range typically had higher inferencing skills than those students reading at a low level. Results also indicate that students’ inferencing skills were more developed when presented with fiction passages than non-fiction passages.

Predictor Variables for Inferencing Abilities

Inferencing Development

Inferencing abilities are influenced primarily by prior knowledge (McCormick & Hill, 2001). When a child has experience with a subject, learning becomes easier and
more concrete. Without prior knowledge and vocabulary to support what is read and learned, inferencing ability is inhibited.

Inferencing abilities of the participants in this study were categorized into five categories of inferential thinkers, outlined by Wade (1990). The participants were placed into five categories: good comprehender, non-integrator, schema imposer, personal storyteller, and non-risk taker. Participants in the current study ranged from good comprehenders to non-risk takers.

Fifty-nine percent of the students in the sample were classified as good comprehenders on fiction passages, and forty percent of the students were classified as good comprehenders on non-fiction passages. These students’ ability to draw on their background knowledge and determine the important clues in the text, contribute to their ability to comprehend and make appropriate inferences. Results also indicated that a higher percentage of good comprehenders were in fifth grade, compared to fourth and third grade students. This representation was true for both fiction and non-fiction passages. The following is an example of a third grade participant who was classified as a good comprehender for the two fiction passages presented:

**There she was. I was finally going to meet her.**

Q: What do you think this is about?

*A: She was finally going to meet someone she hasn’t met yet.*

Q: What clues make you think that?

*A: I was finally going to meet her.*

This participant was classified as a good comprehender because an inference was made and the thinking process was logical. The student was also able to use the clues in the passage to help make an inference. The following is another example of the same participant who was classified as a good comprehender on the two non-fiction passages presented:

**Some of their veins are easy to see but even when they are not, they have them.**

Q: What do you think this is about?
A: This is about leaves.
Q: What clues make you think that?
A: Because you can see veins in it, but even when you can’t see it they’re still the same.

This student was classified as a good comprehender for this non-fiction passage because a logical inference was made using logical thinking. The student was also able to use the clues in the passage to help make an appropriate inference; this example also points to the importance of prior knowledge and experience in the subject matter.

Eight percent of students were classified as non-integrators for fiction passages, and twenty-seven percent for non-fiction passages. Non-integrators draw on prior knowledge and text clues to develop new hypotheses for every segment of the text. They never consistently relate new hypotheses to previous ones or to information presented earlier in the text (Wade, 1990). The following is an example of a third grade participant who was classified as a non-integrator for one of the two fiction passages presented:

The room was very colorful and bright and I could see we would be doing a lot of reading.
Q: What do you think this is about?
A: At the library.
Q: What clues make you think that?
A: Quiet and everybody was reading.

In one part of the room there were six red and yellow bean bag chairs on a thick, bright blue carpet.
Q: What do you think this is about?
A: Birthday party.
Q: What clues make you think that?
A: Might be in the room, she might have bean bags and stuff.

This participant was classified as a non-integrator because a new hypothesis was developed for every segment of the passage. The student did not relate the new
hypothesis to previous inferences or to information that was presented earlier in the text. The following is another example of the same participant who was classified as a non-integrator on the two non-fiction passages presented:

**Holes in them let air in and out. They can float through the air on the wind.**

Q: What do you think this is about?

_A: Birds._

Q: What clues make you think that?

_A: Birds make a nest._

**People take trips to see their changes.**

Q: What do you think this is about?

_A: Zoo._

Q: What clues make you think that?

_A: Animals help other animals in the zoo make homes._

This student was classified as a non-integrator for this non-fiction passage because the student developed a new hypothesis for every segment of the passage. The student also did not relate new hypotheses to previous ones. The examples represent a typical response of a third grader classified as a non-integrator.

Two percent of the total sample was categorized as a schema imposer only for fiction passages. Schema imposers hold on to the initial hypothesis when it is no longer supported by the text. Students do this by forcing new information to fit their hypothesis by ignoring conflicting information (Wade, 1990). The following is an example of a third grade participant who was classified as a schema imposer for both of the two fiction passages presented:

**I thought about this day for months. She didn’t look anything like I expected.**

**She had dark hair and squinty eyes.**

Q: What do you think this is about?

_A: A new friend._

Q: What clues make you think that?
A: *Because she saw one.*

As I looked up at her from my seat it seemed like her face was far away. Her nose seemed long and pointy. My tummy was starting to feel upset.

Q: What do you think this is about?

A: *Not having a friend.*

Q: What clues make you think that?

A: *Because she think she doesn’t look right.*

This participant was classified as a schema imposer because the initial hypothesis developed continued despite incoming information that conflicted with the original hypothesis. Every response given by the student in this passage related to a friend, despite the other clues which were presented. The other clues should signal to the student other alternatives.

Non-risk takers were comprised of eight percent of the population for fiction passages and six percent for non-fiction passages. Third grade participants were the only population who exhibited non-risk taker characteristics. Non-risk takers fail to go beyond the text to develop new hypotheses, and often rely on the examiner for clues rather than risk wrong guesses. Non-risk takers either lack or underutilize their background knowledge and rely on the text to suggest an appropriate inference (Wade, 1990). The following is an example of a third grade participant who was classified as a non-risk taker for the two fiction passages that were presented:

**In one part of the room there were six red and yellow bean bag chairs on a thick, bright blue carpet.**

Q: What do you think this is about?

A: *Chair on a big thick blue carpet?*

Q: What clues make you think that?

A: *Story told us.*

This participant was classified as a non-risk taker because the student answered the questions using a rising intonation. The student also did not attempt to go beyond the
text to develop a new inference. When asked what clues formed the inference, the student only responded with, “the story told us.” This response indicates a passive role by the student, indicating a non-risk taker. The following is another example of the same participant who was classified as a non-risk taker on the two non-fiction passages:

**People take trips to see their changes.**

*Q:* What do you think this is about?
*A:* *People taking trips and changes*

*Q:* What clues make you think that?
*A:* *Don’t know.*

This student was classified as a non-integrator for this non-fiction passage because the passage was repeated back almost verbatim when asked “what makes you think that?” The student responded “I don’t know,” when asked “what clues make you think that?” These characteristics are common in non-risk takers.

In the present study there were not any participants classified as a personal storyteller. However, some students did relate a personal experience and tell a personal story when answering questions about the passages. The following is an example of a fourth grade student classified as a good comprehender, the student was able to relate to the passage due to a past experience:

**All of the parents are watching me.**

*Q:* What do you think this is about?
*A:* *A play.*

*Q:* What clues make you think that?
*A:* *I was in a play on Friday, that’s how it was, the parents were watching us.*

This student was not classified as a personal storyteller, but a good comprehender. A good comprehender uses past experiences and draws on their background knowledge to determine the important clues in the text. This past experience, such as a play, contributes to their ability to comprehend and, make appropriate inferences. The participant was not classified as a personal storyteller because according to Wade’s
(1990) classification personal storytellers tend to draw far more on prior knowledge and experiences than on information in the text. This student used the clues from the text to make an inference by relating it to his prior experience. None of the participants in the current study drew more from personal experience when making an inference than drawing from the text presented.

Results also indicate that students may be classified as a good comprehender for fiction passages but a non-integrator for another type of passage. This was common for non-fiction as well. This dual classification of a good comprehender and non-integrator occurred for 21% of students listening to fiction passages. The following classifications are for non-fiction passages: good comprehender and non-integrator (21%); good comprehender and non-risk taker (2%); and non-integrator and non-risk taker (2%).

Effects of Reading Ability on Inferencing Abilities

The findings of this investigation are in agreement with previous research pointing to the importance of reading ability on the development of inferencing ability. Wilson (1979) found that inferential questions were significant predictors of differences of performance between average and below average readers. Previous research has also shown that recognizing inferred information is more problematic for below-average readers than for average readers (Crais & Chapman, 1987; Oakhill, 1984). Leslie and Caldwell (2000) also found evidence that skilled readers, those with higher levels of prior knowledge, understood and comprehended the text better and more accurately than poorer readers struggling with unfamiliar text. Beers (2002) indicates that inferencing abilities can be inhibited due to low reading ability and comprehension. Similarly, in the present study, reading ability of the participants was found to be significant in predicting inferencing ability among third and fourth grade students.

Effects of Educational Implications on Inferencing Abilities

In this investigation, the grade level of the participants was found to be a significant predictor of inferential thinking abilities. Logical thinking, clue selection, and inferential thinking abilities of participants in third grade were not as developed as participants in fourth and fifth grades. Similarly, fourth grade participants’ logical thinking, clue selection, and inferential thinking abilities were not as developed as fifth grade participants. This trend of skill development reflects the guidelines of the Ohio
Department of Education, which dictates when and what is expected in the development of students’ inferencing skills. The Ohio Department of Education in the Ohio Academic Content Standards (OACS, 2005) outlines at what grade and in what format inferencing skills should be taught, drilled, and developed. The OACS state students’ inferencing skills should be an ongoing process. Throughout students’ educational experience developing and learning to apply strategies, such as predicting and inferencing, helps students to comprehend and interpret informational and literal text (OACS, 2005). The OACS (2005) also indicate that students should be making inferences regarding events and possible outcomes from information in the text, and should be able to answer inferential questions to demonstrate comprehension of grade-appropriate print texts by the completion grade three, four, and five. Students should also be able to answer inferential questions to demonstrate comprehension of grade-appropriate print texts (OACS, 2005).

**Effects of Fiction versus Non-Fiction on Inferencing Abilities**

In the present investigation, fiction versus non-fiction passages did have an impact on clue selection, logical thinking skills, and inferencing abilities of the participants. The current study presented two fiction and two non-fiction passages to each participant. Results indicate that students’ clue selection, logical thinking abilities, and overall inferential thinking abilities were more developed in fiction passages than non-fiction passages. Results also indicated that students in grade five did not exhibit much difference between fiction and non-fiction passages in regards to their clue selection, logical thinking skills, and overall inferential thinking abilities. The difference in fiction and non-fiction passages in grades three and four may be due to text interest and/or experiences of the student. Wade, Buxton & Kelly (1999) state that readers’ text interest influences comprehension of read material. In the current study the non-fiction passages may not have been as interesting as the fiction passages; therefore not allowing higher levels of comprehension compared to non-fiction passages. Lack of prior experiences of the non-fiction passages presented may also be a factor in the difference between fiction and non-fiction passages. Without the prior knowledge of the topic, participants may have had more difficulty inferring throughout the passage.
Role of Speech-Language Pathologists and Classroom Teachers on Inferencing Abilities

Speech-language pathologists (SLP) often work with individuals with language needs that focus on development of inferential skills. Students’ prior knowledge of information and concepts allows new learning to be facilitated in the classroom. It is important for SLPs and classroom teachers to increase students’ world knowledge. A strategy SLPs should use to facilitate inferencing abilities of students include aiding in students’ comprehension skills of text. To facilitate this skill, SLPs should model how to reason, make assumptions, and resolve conclusions from the text (Hansen, 1981; Hansen & Pearson, 1983; Mantione & Smead, 2003; Raphael & Wonnacott, 1985). An activity SLPs may use with a student is sequencing. While doing this activity the SLP should focus on having the student make inferences about the outcome and content presented throughout the text. Wade (1990) also suggests SLPs should focus intervention on encouraging readers to entertain alternate interpretations and multiple perspectives when presented with text information. This could be incorporated throughout the school day through writing and reading activities by making webs or graphic organizers about different perspectives the text presents. These methods are important for classroom teachers and SLPs to incorporate throughout a student’s educational experience in order for inferencing skills to be learned and mastered.

Conclusions

Overall the study has shown that participants’ overall inferential thinking abilities were found to show a pattern for each grade level on both fiction and non-fiction passages. Results also concluded that clue selection was not found to be affected by the use of fiction versus non-fiction passages in grades four and five. But statistically significant evidence indicated some indication that third graders clue selection abilities are worse in non-fiction than fiction passages. Also logical thinking skills were found to be affected by the use of fiction versus non-fiction passages in all three grade levels. Another result of the current study indicates that inferential thinking abilities are affected by the use of fiction versus non-fiction passages. The final conclusion found was that fiction and non-fiction passages do affect students’ clue selection and logical thinking abilities based on their reading level.
Limitations

Several factors in the study could be strengthened. The sample size was relatively small and drawn from one school district in Southwestern Ohio; therefore, the population was relatively uniform with minimal cultural differences. The current study only presented four passages which were read to the students. If students were presented with more passages, more predictive conclusions could be made about their inferencing abilities. However, this would require more time to complete the study. Current testing time took third grade students about 25 to 30 minutes to complete four passages, and fifth grade participants took about 15 to 20 minutes. Increasing the number of passages would require more time for participants to complete the study.

Participants were not required to read the set of passages in the study, this may have been beneficial for some students, but also may have hindered some participants’ performance. Some students’ would be able to comprehend material they read better than listening to the passages read aloud. If students would have read the material independently, some may have had difficulties with comprehending the information presented in the passages.

Implications for Further Research

Previous research have supported the theory that inferencing abilities are linked to prior knowledge, reading levels and comprehension, along with grade level, clue selection, and logical thinking abilities. (Beers, 2002; Crais & Chapman, 1987; McCormick & Hill, 2001; Leslie and Caldwell, 2000; OACS, 2005; Oakhill, 1984; Wade, 1990; Wilson, 1979). Fewer investigators have examined how fiction and non-fiction influence the development of inferencing abilities.

Future research should focus on presenting the same procedures to larger populations in third, fourth and fifth grade classrooms to determine if any developmental changes occur within the three grade levels of the predictor variables, which are clue selection, logical thinking, reading level, and overall inferential thinking abilities. Future research should also specifically investigate fiction versus non-fiction passages in relation to the development of inferencing abilities. This research should include more than two fiction and two non-fiction passages to verify the current results correlate. Further research could also be performed to determine the development of inferencing abilities
through fiction and non-fiction passages. This research should focus specifically on when inferencing abilities develop with fiction versus non-fiction and include factors of reader text interest. The current study indicated that inferencing abilities were more developed on fiction passages than non-fiction.

Finally, research could be continued with this population of participants with different presentation methods; the examiner could contract inferencing skills when students read the passages instead of the investigator reading to the student. The current study did not have participants read passages to control for presentation method. Future studies should also be conducted with other grade levels. Information from higher and lower grade levels would be beneficial to speech-language pathologists and classroom teachers in order for appropriate intervention to be given for children at risk for not developing inferencing skills.

Clinical Implications

The current investigation further supports the relationships that have previously been stated between reading level, grade level, and fiction versus non-fiction passages. The results of this study confirm the importance of speech-language pathologists and educators focusing on inferencing development when working with children. The current study was designed to show a pattern of what the student thought the most salient clues were in the passage, and putting these clues together in a logical way to make sense of the passages. This pattern provides an explanation to SLPs and classroom teachers on how to aid in developing their students’ inferencing skills. The breakdown of the students’ skills is evident when students try to make an inference. This experimental test may be used by SLPs and classroom teachers as a method for teaching students’ how to infer. This test can be used as a teaching tool through modeling how to select the most important clues in the text, and then using these clues to make a logical inference. This tool is an easy and quick way for SLPs and classroom teachers to screen and/or evaluate students’ inferencing abilities.

Inter-rater reliability was estimated by two examiners analyzing participant’s (n=10) responses and then rating appropriately. Each examiner individually categorized each participant’s overall inferencing ability. Results were compared, and were found to be similar. However, when the examiners analyzed and scored participants’ clue selection
and logical thinking abilities, the examiners scores did not match exactly. This scoring discrepancy was deemed to not be an issue. The examiners determined it was more important to establish if the student was or was not able to select the correct clues and think logically. Therefore, the rubrics for clue selection and logical thinking skills were not needed in order to determine if the participant was able to select the appropriate clues and think logically. A rubric containing only the numbers one and zero would have been sufficient. The score of one would indicate that the student had the corresponding skill, and a score of zero would indicate that the student was unable to perform the skill. This type of rubric would have been more useful. This new rubric would simply classify students as either having or not having the skill. This classification would have been more beneficial to the overall study, and would also imply to SLPs and classroom teachers the areas in need of remediation for students.

Chapter Summary

This chapter provided information regarding the current study and related research, conclusions, limitations of the current study, implications for further research, and clinical implications. It was concluded that inferential thinking abilities are influenced by the students’ prior knowledge of the subject, their reading level, grade level, and if the passages were presented in fiction or non-fiction passages. The importance of the role of the early educators and speech-language pathologists in teaching inferencing skills was noted. The limitations of this study were presented and should be considered when interpreting the results of this study. Further research on a more diverse population may enhance and validate the findings of the current study.
References


Ohio Department of Education (2005). *Academic content standards K-12 English language arts*. Columbus, OH.


Appendix A

Dear Parents or Guardians:

Hello my name is Megan Wagner. I am a graduate student at Miami University, and am studying Speech-Language Pathology. I am conducting a research study on inferencing abilities of third, fourth, and fifth grade students. Inferencing is going beyond the text and using prior knowledge and clues from the story to draw conclusions that are important to understanding the underlying meaning. For instance, students should be able to conclude that a story is describing a bear based on the description and activities in the story about a bear. The ability for students to draw inferences is expected to be developing throughout the elementary school years.

I would like to have your permission to allow your child to take part in the study. I will ask your child to listen to four stories, both fiction and non-fiction. During certain points throughout the passage I will stop and ask them what they think is happening and why. I will record their responses during each answer. Each student’s inferencing abilities will be rated based on their responses to the passages.

All information is strictly confidential. Your child’s name will not be associated with their responses in any way. The session should take approximately 20 minutes to complete. If at any time your child would like to stop and withdraw from the session, or does not want to answer any of the questions they may.

There are no risks associated with this study. The benefit of the study is to help Speech-Language Pathologists and Classroom Teachers identify their students’ inferencing abilities. Early identification will allow your child to receive appropriate intervention for inferencing.

If you have further questions about the study, please contact Megan Wagner at 529-2550, marksmj@muohio.edu or Dr. Kathleen Hutchinson at 529-2509, hutchik@muohio.edu. If you have questions about your child’s rights as a research participant, please call the Office of Advancement of Research and Scholarship at 529-3734 or email: humansubjects@muohio.edu

Thank you for allowing your child to participate. I am very grateful for your help and hope that this will be an interesting session for your child. You may keep this portion of the page.

************************************************************************
Cut at the line, keep the top section and return the bottom section to your child’s classroom teacher.

I agree to allow my child to participate in the research study of inferencing abilities of third, fourth, and fifth grade students. I understand my child’s participation is voluntary and that their name will not be associated with their responses.
Parent or Guardian’s Signature _______________________________________

Child’s Name ________________________________________________

Child’s Signature ____________________________________________

Date _______________________________________________________
Appendix B

Dear Classroom Teacher:

Hello my name is Megan Wagner. I am a graduate student at Miami University, and am studying Speech-Language Pathology. I am conducting a research study on inferencing abilities of third, fourth, and fifth grade students. Inferencing is going beyond the text and using prior knowledge and clues from the text to draw conclusions that are important to understanding the underlying meaning. The ability for students to draw inferences is expected to be developing throughout the elementary school years.

I would like to have your permission to allow students in your classroom to take part in the study. I will ask the child to listen to four stories, both fiction and non-fiction. During certain points throughout the passage I will stop and ask them what they think is happening and why. I will record their responses during each answer. Each student’s inferencing abilities will be rated based on their responses to the passages.

All information is strictly confidential. Each child’s name will not be associated with their responses in any way. The session should take approximately 20 minutes to complete. If at any time the child would like to stop and withdraw from the session, or does not want to answer any of the questions they may.

There are no risks associated with this study. The benefit of the study is to help Speech-Language Pathologists and Classroom Teachers identify their students’ inferencing abilities. Early identification will allow each child to receive appropriate intervention for inferencing.

If you have further questions or concerns about the study, please contact me at 529-2550, marksmj@muohio.edu or Dr. Kathleen Hutchinson at 529-2509, hutchik@muohio.edu. Dianne Clemens, M.S., CCC-SLP, has agreed to assist in recruiting for the study; questions may also be directed to her. Thank you for allowing the children in your school to participate. I am very grateful for your help and hope that this will be an interesting session for all children.

Sincerely,

Megan M. Wagner, B.A.
Graduate Clinician
Miami University
# INFERENCING ANALYSIS RECORDING FORM

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<td>Student’s Age</td>
<td>Students Grade Level</td>
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<td>Clue Selection/Determining What’s Important</td>
<td>Score</td>
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## EXPLANATION
### OF THEIR INFEERENCE/LOGICAL THINKING

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<td>The inference the student made and/or their thinking about why they made that guess was logical most of the time.</td>
<td>75 - 100%</td>
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<td>3</td>
<td>The inference the student made and/or their thinking about why they made the guess was logical some of the time.</td>
<td>50 - 74%</td>
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<tr>
<td>2</td>
<td>The inference the student made and/or their thinking about why they made that guess was NOT logical some of the time.</td>
<td>25 - 49%</td>
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<td>1</td>
<td>The inference the student made and/or their thinking about why they made that guess was NOT logical most of the time.</td>
<td>0 - 24%</td>
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<tr>
<td>0</td>
<td>Did not attempt to guess or explain.</td>
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CLUE SELECTION/DETERMINING WHAT’S IMPORTANT

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<th>Description</th>
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<td>Definitely selected significant clue(s) most of the time.</td>
<td>75 - 100%</td>
</tr>
<tr>
<td>3</td>
<td>Selected significant clue(s) some of the time.</td>
<td>50 - 74%</td>
</tr>
<tr>
<td>2</td>
<td>Did not select the important clue(s) some of the time.</td>
<td>25 - 49%</td>
</tr>
<tr>
<td>1</td>
<td>Did not select the important clue(s) most of the time.</td>
<td>0 - 24%</td>
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<td>Did not try to select a clue.</td>
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## Appendix F

### INFERENTIAL THINKING ABILITIES

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<tr>
<th>Type</th>
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<tbody>
<tr>
<td><strong>Good Comprehender</strong></td>
<td>The student makes inferences by integrating the clues and changing the hypothesis as needed. The student knows when more information is needed. The student keeps the clues that are significant and discards unimportant clues. The student monitors their comprehension.</td>
</tr>
<tr>
<td><strong>Non- Integrator</strong></td>
<td>The student develops a new inference for each segment presented. Each segment presents new clues and the student’s inference changes to match the new clues. The student does not integrate the clues.</td>
</tr>
<tr>
<td><strong>Schema Imposer</strong></td>
<td>The student develops their initial inference and never changes it.</td>
</tr>
<tr>
<td><strong>Personal Storyteller</strong></td>
<td>The students identifies with the topic of the text and wants to tell the examiner a story about what the text has made him think about.</td>
</tr>
<tr>
<td><strong>Non-Risk Taker</strong></td>
<td>The student lacks confidence. The student looks for clues from examiner. The student may repeat words or phrases. The student may often respond “I don’t know.” The student gives their hypothesis using a questioning intonation.</td>
</tr>
</tbody>
</table>

Appendix G

**Child Permission Text**

During the next fifteen minutes you are going to hear four passages about various things. I am going to read the passages to you and stop at specific times. When I stop I will ask you two questions. These are “What do you think that this is about?” and “What clues make you think that?” Please answer as best as you can. There is no such thing as a wrong answer. If at any time you want to stop and take a break or not finish the questions you are able to without any penalty. Throughout the next fifteen minutes I am trying to see how your inferencing skills are. Inferencing is being able to use clues that you hear or read from books, movies, or during everyday events to decide what is going on. Do you have any questions?
Appendix H

DIRECTIONS

I’m going to read you a story. I will read you a few sentences and then I am going to stop and ask you “What you think it is about?” You will tell me and then I will ask, “What clues make you think that?” After you answer I will read a few more sentences and stop and ask you the questions again. All of the clues I give you will be about one thing. You probably won’t know what the story is about right away and that’s okay. Just keep thinking about the clues to figure out what this whole story is about. You have plenty of time to think and answer so take your time if you need it.

As you answer I will be writing so I can remember what you said. Remember you probably won’t know what the story is about right away.

Now let’s try a short one together just to make sure you understand what to do.

Read: The boy walked up to his house and saw lots of cars in the driveway.

Say: “What do you think this is about?”
Write Answer: ____________________________________________

Say: “What clues make you think that?”
Write Answer: ____________________________________________

Read: He walked into the house and saw his mother, sisters, aunts and cousins laughing and talking.

Say: “What do you think this is about?”
Write Answer: ____________________________________________

Say: “What clues make you think that?”
Write Answer: ____________________________________________

Read: On the table he saw party hats, balloons, streamers and a cake with candles.

Say: “What do you think this is about?”
Write Answer: ____________________________________________

Say: “What clues make you think that?”
Write Answer: ____________________________________________

That was great.

Let’s get started.

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Read: Susan was invited to go out to dinner with her friends. She was excited, but disappointed at the same time.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: As Susan arrived at the restaurant she only saw one friend, Molly. “Where is everyone else,” Susan asked? Molly replied, “They couldn’t make it, sorry Susan.”
Susan tried to smile, but she was really feeling very sad.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: After Susan and Molly finished their meals, Susan asked Molly to go to a movie. Molly explained to Susan that she needed to go home and go to bed.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: Susan again, felt very disappointed and unhappy. “They have forgotten this special day,” Susan thought.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________
Read: As Susan drove home she became more and more sad. She didn’t even notice all the cars parked outside her house.  
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: As she pulled into her driveway Susan began to cry. How could all of my friends forgotten this day, it’s not fair!
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: Susan walked up to her front door and went inside. Her house was dark and empty. Suddenly the lights flickered on and she heard screams from all of her friends.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: Happy Birthday, all Susan’s friends yelled. Susan was so excited and surprised. This was the best birthday ever!!!
Read: There she was. I was finally going to meet her.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: I thought about this day for months. She didn’t look anything like I expected. She had dark hair and squinty eyes.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: As I looked up at her from my seat it seemed like her face was far away. Her nose seemed long and pointy. My tummy was starting to feel upset.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: She was dressed in a long black skirt and black high heeled shoes with pointy toes. Now, my tummy was feeling worse.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________
Read: The room was very colorful and bright and I could see we would be doing a lot of reading.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: In one part of the room there were six red and yellow bean bag chairs on a thick, bright blue carpet.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: She began to talk and everyone got quiet.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: She said, “Good morning everyone. Welcome to first grade. My name is Ms. Taylor. I’m sure we’re going to have a fun year.” I saw her big, beautiful smile and I started to feel better.
Read: You can’t see it but you can see what it does. It can do many things.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: It can be gentle or violent.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: It’s a powerful force that can damage and destroy things or it can be a source of fun.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: People often depend on it for their enjoyment. It can help people and some animals move from one place to another.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________
Read: New plants are helped to grow because it scatters seeds and pollen across the land.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: It’s energy. Its power has been used for hundreds of years. In some places it is turned into electricity to operate machines.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: We can see it push clouds across the sky or rustle leaves on trees.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: Wind can carry a kite, blow wind chimes, or push a sailboat over water.
Read: Both people and animals use them for food and to make their homes.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: You can find them in all shapes and sizes with smooth or pointy edges.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: Some are shiny while others are dull. Most are green but they can be red or purple. Some even have stripes or dots.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: Some of their veins are easy to see but even when they are not, they have them.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________
Read: Holes in them let air in and out. They can float through the air on the wind.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: People take trips to see their changes.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: Without them plants would die, because they use air and sunlight to make food for the plant. This is called photosynthesis.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: Leaves are an important part of the plant.
Read: Thank goodness. We just made it. Fifteen more minutes and the salesman would be locking the door.
“What do you think this is about?”
Answer: ____________________________________________________________________________

“What clues make you think that?”
Answer: ____________________________________________________________________________

Read: Blake and her father stood there for a while looking in the case.
“What do you think this is about?”
Answer: ____________________________________________________________________________

“What clues make you think that?”
Answer: ____________________________________________________________________________

Read: There were only five left. Blake looked up smiling at her Dad. “Well Dad,” she said, “which ones do you think I should get?”
“What do you think this is about?”
Answer: ____________________________________________________________________________

“What clues make you think that?”
Answer: ____________________________________________________________________________

Read: She decided on one black and one brown one. After Blake pointed to the tow she wanted the salesman quickly picked them up.
“What do you think this is about?”
Answer: ____________________________________________________________________________

“What clues make you think that?”
Answer: ____________________________________________________________________________
He put them in a box and handed them to Blake. Once they were home Blake opened the box and they darted out.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Their fur was shiny and felt so soft as they petted them.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

One of them immediately began to pile up the wood shavings to make a little nest, while the other one went through the paper towel tube and then ran on the wheel.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Blake was happy to have her new pet gerbils even if they did keep her up all night as they ran in their squeaky wheel.
Read: I am so nervous, what if I mess up, what if I embarrass myself?
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: All of the parents are watching me.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: I can feel my face turning red. Mom says to pretend they are not there, but I
know they are watching closely to see if I mess up.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: What if I forget my lines, what will I do? I have practiced so much and hard,
but what if I can’t remember them?
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: The director signals for me to start my performance, but I cannot move.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________
Read: I feel a slight push from behind, so I move forward in front of a huge smiling audience.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: I walk up to a microphone in front of a huge audience and smile. The applause starts and I hear the piano begin.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: I step up to the microphone, and begin to sing in my first recital ever.
Read: Boys and girls can all play this popular game.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: It can be played during any month of the year. It can be played indoor or outdoor.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: It takes a lot of practice to be very good at this game. You can watch it on television, in a gym, or play it in your driveway.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: Many players are on each team, but only five can play at one time. Whichever team has the most points at the end of the game is the winner.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________
Read: Players use many strategies and plays to try and score.
“What do you think this is about?”
Answer: 

“What clues make you think that?”
Answer: 

Read: After five fouls players are not able to play anymore.
“What do you think this is about?”
Answer: 

“What clues make you think that?”
Answer: 

Read: The players try and score by putting an orange ball in a basket.
“What do you think this is about?”
Answer: 

“What clues make you think that?”
Answer: 

Read: Basketball is a fun and exciting game which, is played and enjoyed by many kids, teenagers, and adults.
Read: Let me tell you about a food the Japanese people believe is a good luck food.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: The good luck food I am talking about is made from a fruit that can be made into cookies, bread and soup. It takes a lot of sun and water for this fruit to grow.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: Farmers know it’s ready to harvest when the skin is tough. They are sure to cut it from the vine before the first frost.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: It grows on a vine that sprouts from its seeds. The vine can be 30 feet long and flowers can grow on it.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________
Read: This fruit comes in all shapes and sizes and has five main parts.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: It has a shell, pulp, seeds, flesh and a stem. Its toasted seeds make a good snack.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: Sometimes they’re made into Jack-o-lanterns at Halloween.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: Illinois grows the most pumpkins in North America. Eureka, Illinois claims to be the pumpkin capital of the world. Every year at its pumpkin festival 10,000 pumpkin pies are given away.
Read: Joe was in his tree house in his backyard when he heard his father call his name “Joe! Come inside!”
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: Joe hid in the deepest and darkest spot of his tree house.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: Joe heard his father again, “Joe, I know you’re out here somewhere, come inside we need to talk.”
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Just as Joe started creeping out of his hiding place, he heard his sister’s voice.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________
Read: Joe couldn’t bear to think of what he’d done. He just wanted to be alone sometimes, but he didn’t want to hurt her feelings.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: Joe heard his father’s voice again, “Joe I know you are in there” “Yeah come out Joe,” his sister yelled. Joe finally found courage to leave his hiding spot. As he slid down the slide he saw his sister and father smiling and starting to laugh.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: “What’s so funny?” Joe insisted. “We have a surprise for you,” his father explained. His father showed Joe a new sign. The sign said “No Girls Allowed” in big red letters.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: “Joe, I won’t bother you in your tree house anymore, because Dad is building me my own, right next to yours!” his sister exclaimed!
Read: I remember rubbing my eyes and hitting the snooze button before I heard my Mom yell “Hurry up I hear it coming.”
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: I quickly threw on my slippers and robe. Shivering, I wrapped my robe tightly around me and flew down the stairs to try and beat it. Moving at lightning speed I pushed opened the door and clenched the handle of the garbage can. I could hear the wheels roll quickly over the concrete.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: I came to a screeching halt at the end of the driveway and felt victorious. I beat it!
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: I could see my breath as I ran back to the garage and something caught my eye.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________
Read: Upon closer inspection two tiny glistening circles could be seen under the car.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: I stood back and out walked a scraggly little creature that looked cold and hungry.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: I scooped him up in my arms and he began to purr.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: That’s how I found my pet cat, Whiskers and he’s still with me today.
Read: Colors and markings can camouflage them. When they’re not camouflaged some can move quickly and hide in small crevices.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: You can find them almost anywhere. Their home can be in trees, gardens, water and even your house. Their pale blue blood keeps their legs stiff.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: Most of them are poisonous but only a few types are dangerous to people.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: Their fangs are sharp and they shoot the poison out through them when they bite you or their prey.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________
Read: They inject their saliva into their prey and turn their solid flesh into squishy mush. They slurp it up leaving only the crunchy shell. The hair on their bodies is used to sense the world around them. Snakes, frogs, birds and lizards love to eat them.

“What do you think this is about?”
Answer: ____________________________________________________________________________________________

“What clues make you think that?”
Answer: ____________________________________________________________________________________________

Read: To escape an enemy they can fly through the air using a dragline they have attached to a surface.

“What do you think this is about?”
Answer: ____________________________________________________________________________________________

“What clues make you think that?”
Answer: ____________________________________________________________________________________________

Read: The silk for their dragline comes from their own body and is very strong. Sometimes their silk is used to wrap their prey. Although some people think they are insects, they are not. They have eight legs and are called arachnids.

“What do you think this is about?”
Answer: ____________________________________________________________________________________________

“What clues make you think that?”
Answer: ____________________________________________________________________________________________

Read: Spiders are interesting but I still don’t want them in my house.
Read: This is a place some animals use to raise their young.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: They spend hours and hours building it piece by piece. It is built out of weeds, twigs, and dry mud.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: The mud becomes like glue, which keeps all the weeds and twigs together.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: After the mud dries, the bottom is filled with soft grass; this grass will help it be safe and snug.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________
Read: This home becomes a very important place for this animal family. This new home will protect any new babies from other animals.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: Once it is strong, the female robin settles down, and lays four beautiful blue eggs. The eggs are very tiny, and are kept warm and safe by their mother until they are ready to hatch.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: The baby birds do not leave until they can fly on their own. After the baby birds can fly, they fly away and do not return to their first home.
“What do you think this is about?”
Answer: ________________________________________________________________

“What clues make you think that?”
Answer: ________________________________________________________________

Read: The nest is left behind when the birds leave. That’s when people like you and I find the small and beautiful creations these birds have built to raise their young.
### Appendix L

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83