

OBSERVATIONS AND CONVERSATIONS: CONSTRUCTING A GROUNDED
THEORY OF EARLY READERS AND NONFICTION TEXTS

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DEDICATION

To my husband, George,
whose love and encouragement
have been my source of strength
throughout this venture.

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Zeek's sensible constructive suggestions led me to provide sensible and reasonable rationale for my research decisions.

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ABSTRACT

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OBSERVATIONS AND CONVERSATIONS: CONSTRUCTING A GROUNDED THEORY OF EARLY READERS AND NONFICTION TEXTS

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Children are expected to read and write increasing numbers of informational texts as they progress through school in preparation for their adult lives. Expertise with informational texts may begin with early exposure to those genres during the primary years. A qualitative study was designed to discover how early readers process information and comprehend the content presented in nonfiction books.

A sample of five early readers participated in three nonfiction reading response sessions. Observations of oral reading behaviors and interview conversations were recorded on handwritten documents and audio and video tapes.

Running record analyses provided insights about how children processed information to read the nonfiction books. Parallel processing, the simultaneous use of several sources of information, comprised most of the children's reading. Parallel processing was evident with mostly accurate oral reading and meaningful approximations that sounded like accurate reading. Successive processing, demonstrated by successive

solving attempts was frequently applied as the children solved or self-corrected errors. Technical terms posed no more difficulty than other types of words contained in the texts.

The children's conversational responses before and after reading revealed how the content presented in the books was comprehended. After reading the children confirmed known knowledge -- topics related before reading, without adding details. New knowledge was designated most frequently through simple statements. Elaboration, extension of known and new knowledge, occurred less frequently. Responses after reading were often facilitated by the pictures; the children related personal experiences to a lesser degree.

A grounded theory was developed to depict how early readers learn about print and from print as they read and respond to nonfiction texts. Meaning played a central role before, during, and after the children read the books. Knowledge refined denotes how the children's knowledge was verified, changed, shifted or expanded after reading the books. Knowledge was refined through responses influenced mostly by accurate reading, meaningful approximations, and successful solving attempts and facilitated through the pictures and/or personal experiences. The early readers were independent active constructors of meaning before, during, and after reading nonfiction texts, demonstrating the ability to learn to read *and* read to learn.

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CHAPTER I

INTRODUCTION

What have you read or written in the past hour? During the past hour, I searched the business section of the phone book to locate Spotbuster's phone number, read the nutritional information on a can of soup, and glanced through a travel magazine. I added some items to a to-do list, sent an email to a colleague, and began writing this problem statement. I engaged in each of these activities for a different purpose; each served a different function. It was necessary for me to know something about these informational genres in order to read (comprehend) or write (communicate) information meaningfully. Genres are forms of oral or written discourse, shaped by typical situations or recurring contexts (Miller, 1984) to serve a specific communicative purpose or function (Kamberelis & Bovino, 1999). Genres are characterized by distinct conventions of structure, style, or content. For example, to locate the Spotbuster's phone number easily, I had to know that phone books are formatted in an alphabetical order list arrangement. My experience reading numerous research articles and dissertations, along with taking research classes, helped me to compose this dissertation in a scholarly manner characteristic of this genre: a drastically different type of writing than my to-do list.

One purpose of education is to guide students to become contributing members in the society in which they live, enabling them as adults to “secure gainful employment and to manage their own lives” (Gardner, Corp Author: National Commission on Excellence in Education, & et al., 1983, p. 5): an especially challenging objective to attain in a society such as ours that consists of “diverse influences of the various social environments” (Dewey, 1966, p. 22). Ours is a literate society, abundant with a variety of informational materials; “without the ability to read well, opportunities for personal fulfillment and job success inevitably will be lost” (R. C. Anderson, Hiebert, Scott, & Wilkinson, 1985, p. 1). Therefore it is necessary that our children acquire a repertoire of both oral and written genres and the ability to process the information contained in them efficiently and effectively in order to become functional, contributing members of a society that values literacy.

Description of the Problem

Young children have demonstrated the ability to speak (Clay, 1991; Genishi & Dyson, 1984; Heath, 1983; Lindfors, 1987), read (Garrick, 1992; Pappas, 1991), and write (Chapman, 1995) in a variety of genres. Children’s first experiences with literacy begin during their preschool years (Bissex, 1980; Clay, 1991; Wells, 1986). Before entering school, some children are exposed to a wide variety of printed materials including storybooks, poetry, factual books and magazines, while others have few, if any, encounters with printed texts. Many young children become familiar with a variety of informational print formats used by adults or older siblings in their homes such as newspaper flyers, product labels, shopping lists, and job applications (Bissex, 1980;

Caswell & Duke, 1998; Purcell-Gates, 1996). Young children's early writings are predominantly expository in nature, imitating some of the more mature forms (Bissex, 1980; Clay, 1975; Newkirk, 1987; Zecker, 1996) they are familiar with at home. However, during their first years in school children are frequently required to write increasingly more narrative texts (Chapman, 1994; Newkirk, 1987; Sowers, 1985). As a result, their narrative writing becomes more conventional in form (Kamberelis, 1999; Kamberelis & Greene, 1992), while non-narrative approximations lag behind and are not as readily developed.

Traditionally it has been thought that children should *learn to read before they read to learn* (Chall, 1983). Consequently young children's textual experiences in school have been predominantly with narrative genres. The textual language structures and patterns inherent in narrative texts resemble their oral language structures (Egan, 1988; Wells, 1986) and stories have the capacity to stimulate the imagination (Adams, 1990; Egan, 1988). This early narrative emphasis may be one reason children have difficulty reading and writing expository texts in later years (Duke, 1999; Newkirk, 1987) and why narrative texts are identified by many students as easier to read (Alverman & Boothby, 1982; Perry, 2001).

Young children's genre awareness is developing during the primary years; they are able to differentiate between genres (Alverman & Boothby, 1982; Donovan, 2001; Donovan & Smolkin, 2002; Hudson, 1986; Kamberelis, 1999; Kamil, 1997; Langer, 1985; Pappas, 1991; Zecker, 1996). Older children demonstrate more knowledge and competence when reading and writing expository text than younger children (Bissex,

1980; Chapman, 1995; Donovan, 2001; Kamberelis & Bovino, 1999; Langer, 1985; Newkirk, 1987; Zecker, 1996). Experience with informational texts enhances children's ability to use the variety of textual structures presented therein (Chapman, 1994; Duke, 1999; Houge, 2000; Kamberelis, 1999; Langer, 1985; Pappas, 1991, 1993; Zecker, 1996) and facilitates understanding and comprehension (Houge, 2000; Moss, 1997) while reading that genre. Instructional practices, such as scaffolding, can enhance children's ability to read and write informational texts (Donovan & Smolkin, 2002; Garrick, 1992; Horowitz & Freeman, 1995; Kamberelis & Bovino, 1999; Perry, 2001).

Several researchers support the need to expand, rather than shift the repertoire of genres young readers are exposed to, creating a better balance between narrative and informational materials. Why? Nonfiction is the preferred genre for some students (Caswell & Duke, 1998; Donovan, Smolkin, & Lomax, 2000; Garrick, 1992; Kamil & Lane, 1997; Pappas, 1991, 1993; Perry, 2001), for others informational texts may be the "catalyst for literacy development" (Caswell & Duke, 1998), and as children progress through school the amount of informational texts they are expected to read and write increases (Duke, 1999; Spiro, Taylor, & Corp Author Illinois Univ. Urbana Center for the Study of Reading; Bolt, 1980). Yet the number of narrative texts made available to students typically outweighs informational genres (Duke, 1999; Lemke, 1994) and children's reading selections reflect this availability (Donovan et al., 2000; Scott, 2000; Smolkin, Donovan, & Lomax, 2000).

Despite the suggestions to increase children's exposure to expository text (Caswell & Duke, 1998; Kamberelis, 1999; Kamberelis & Bovino, 1999; Pappas, 1993; Perry, 2001) the emphasis on narrative still prevails (Duke, 1999), denying children a "full access to literacy" (Pappas, 1993). This denial may actually delay the reading development of children who prefer other genres (Donovan & Smolkin, 2002; Duke, 1999) or who are exposed to informational genres in their homes and communities (Bissex, 1980; Caswell & Duke, 1998; Purcell-Gates, 1996). Instructional emphasis on narrative texts may be placing children at a disadvantage by inadequately preparing them to effectively read and write a genre that they will be expected to use throughout a lifetime (Newkirk, 1987; Pappas, 1993).

Rationale

Recently researchers have explored young children's abilities and proficiency with informational texts. They have examined children's early writing development (Bissex, 1980; Chapman, 1994; Kamberelis, 1999; Newkirk, 1987); responses to read alouds (Moss, 1997), pretend readings (Pappas, 1991, 1993), effects of instructional practices (Donovan & Smolkin, 2002; Kamberelis & Bovino, 1999), and preferences (Caswell & Duke, 1998).

Processing and comprehension are closely related to each other and difficult to separate. Processing is "the course of active change" (Harris & Hodges, 1995, p. 195) and refers to the way readers use information to comprehend or understand what they are reading (Clay, 1991). Readers use information from a variety of sources (Clay, 1991; Goodman, 1994; Rumelhart, 1994) including prior knowledge of a topic or subject

matter, life experiences, knowledge of oral and written language structures, and phonetic and orthographic knowledge. Comprehension or comprehending is dependent on what the reader knows before reading (Goodman, 1994); what an individual knows or comprehends before reading is changed or processed as a reader comprehends new concepts both during and after reading. What remains to be explored is how early readers process information *while* they are reading and how they comprehend the content presented in nonfiction texts.

Purpose of the Study

The purpose of this study was to discover how early readers process information and comprehend the content presented in nonfiction texts. Observations and analyses of children's behaviors as they read provided insights regarding processing, attention, and comprehending during reading. Reading behaviors were analyzed to discover how children processed information when reading nonfiction books. Conversations with the researcher before and after reading revealed how the children's knowledge was verified, shifted or changed during the reading process.

Questions

1. How do early readers process information when reading nonfiction texts?
2. What do children's responses reveal about comprehending nonfiction texts?

Definitions

Beginning Readers – Beginning readers are children who are learning to read and write. During the first 3 years of school children develop a processing system that enables them to problem solve on increasingly difficult texts. These changes take place over time, from 5 to 8 years of age, as children develop control over written language. By approximately 8 years of age successful readers have acquired “effective processing systems” (Clay, 2001, p. 49) for solving new or unknown words encountered in new texts. Early readers are in the process of developing control over written language as they acquire a processing system. Early readers were considered beginning readers in this study.

Early Readers – Early readers are in transition as they gain control of conventional literacy behaviors and strategies. Characteristics of early readers (Fountas & Pinnell, 1996) include:

1. Relying more on the text and less on the illustrations for support.
2. Fluency with several high frequency words.
3. Control of beginning literacy behaviors such as directionality and

word-to-word match. Directionality refers to the movements readers engage in to read text (Clay, 1991). For example, going from the top to bottom of the page, left to right across a line and return sweep to the left of the line below. Word-to-word match refers to the ability to attend to one word at a time in “sequential order” (Clay, 1993b, p. 21).

4. Developing a network of strategies such as monitoring (checking), searching (looking), cross-checking (comparing one source of information with another), and self-correcting to facilitate effective reading.

5. Developing the ability to use reading strategies with more than one source of information.

6. Are able to read “appropriately selected texts independently” (Fountas & Pinnell, 1996, p. 177) following an introduction by the teacher.

Children exhibiting the behaviors outlined above were selected as participants in the study.

Emergent literacy – “How reading and writing concepts, behaviors, and dispositions precede and develop into conventional literacy” (Teale, 1995, p. 71).

Emergent literacy emphasizes the child’s point of view and examines “changes over time in how the child thinks about literacy and in the strategies the child uses in attempts to comprehend or produce written language” (Teale, 1995, p. 71). The children in this study were on their way to developing “conventional literacy”.

Genre – Genres are forms of oral or written discourse, shaped by recurring contexts or typical situations (Miller, 1984) for specific communicative purposes or functions (Kamberelis & Bovino, 1999). Genres are characterized by distinct conventions of structure, style or content in recurring contexts. They are comprised of a complex network of interrelationships; between substance, form, context (Chapman, 1995) and purpose with social, cultural, and historical origins (Freedman, 1993).

Narrative text – Narrative text is a written composition that “tells a story or gives an account of something” (Harris & Hodges, 1995, p. 162). The sequences of events and experiences in narrative text are usually related chronologically with a beginning, middle, and end. They are “organized by structures that can be anticipated by the audience” (Harris & Hodges, 1995, p. 162) with imagined characters that develop and grow as a result of experiencing some sort of conflict which they must resolve (Bamford & Kristo, 2000).

Nonfiction – The primary purpose of nonfiction is to provide information, explain, argue, demonstrate, or describe (Bamford & Kristo, 2000; Harris & Hodges, 1995). Informational books are types of nonfiction books that present information factually, typically in a straightforward manner. The terms informational text, expository text and nonfiction will be used interchangeably throughout this text.

Note: Nonfiction texts with narrative structures were not used in this study.

Processing – Processing is “the course of active change in some specific way” (Harris & Hodges, 1995, p. 195). Processing while reading refers to the way children access and use information from a variety of sources, outside of and within a text, relating these sources to each other in order to understand the message (Clay, 1991).

Reading Quality – Quality may be defined as a “distinguishing attribute” or an “inherent feature” (Merriam-Webster's Collegiate Dictionary - Tenth Edition, 1995). For the purpose of this study reading quality is defined as the attributes that distinguish one type of reading response from another. For example, accurate reading refers to reading that is read correctly the first time; a self-correction means that a reader corrected a

previously made error. The terms correct reading and self-correction are used to distinguish these responses from each other; each has a different quality regarding the reading that takes place.

Reading Strategy – Strategies are the systematic procedures that are used to improve performance while learning (Harris & Hodges, 1995, p. 244). *Reading strategies* are “unobservable in-the-head” (Clay, 1991, p. 328) strategies referring to how children make sense of or use meaning to direct the process of reading, how they use their language abilities, how they notice errors, and how they go about self-correcting those errors (Clay, 1991).

Triangulation – Triangulation is the comparison of two or more different types of data collected by different methods to validate research findings (Silverman, 2001), and to arrive at a comprehensive analysis of the data (Mays & Pope, 2000). Interviews, observations, documents, and artifacts are examples of different types of data collected by different methods.

Significance

Knowledge of how children read and comprehend nonfiction texts will equip teachers with effective ways to facilitate comprehension of expository genres with beginning readers. Individuals involved in higher education and professional development may use the knowledge of how children process and comprehend nonfiction texts to devise and promote effective instructional practices. Information regarding children’s ability to read nonfiction texts will enable those responsible for selecting and purchasing texts to make prudent decisions regarding genre selections for classroom and

library collections. The facility with which the children are able to read these books and the features that help them to do so (or not), will make it possible for authors and publishers to produce books with topics, structures, organizational features, and formats that are appropriate for young readers.

Recently several literacy experts and scholars have advised that children should be offered more opportunities to read and write informational texts in primary classrooms (Donovan & Smolkin, 2002; Kamberelis, 1999; Musthafa, 1996). Yet many classroom libraries still have proportionally more narrative texts and the majority of children's time is spent reading and writing narrative materials. Additional research in this area will help to clarify and extend understandings about young children's ability to read informational materials. Information comes to us from a variety of sources in many mediums and interfaces, and often has to be processed quickly. Knowledge of how children are reading and comprehending nonfiction texts will enable educators to develop effective instructional practices for beginning readers. These practices may be designed to facilitate proficiency and expertise with informational genres. Consequently, more children may become literate, especially children whose needs may not be met on a diet consisting primarily of narrative text.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this study was to discover how early readers process information and comprehend the content presented in nonfiction texts. Two questions will be used to guide the research:

1. How do early readers process information while reading nonfiction texts?
2. What do children's responses reveal about comprehending nonfiction texts?

Chapter II reviews literature pertaining to primary age children's ability to read and write informational genres. Specific topics include: (a) developing oral and written language genres, (b) reading processes, (c) assumptions about text structure, (d) reading and writing expository genres, (e) experience and instruction with informational genres, (f) multiple genres in primary years, and (g) a summary of the literature review.

Developing Oral and Written Language Genres

Children begin to develop a repertoire of oral language registers at a young age (Clay, 1991; Genishi & Dyson, 1984; Heath, 1983; Lindfors, 1987), as they are learning oral language (Musthafa, 1996). Written and oral language are similar, but written language "can take recognizably different forms and is marked by different linguistic features as it serves different communicative functions" (Purcell-Gates, 1996, p. 410).

As a child has repeated encounters with printed language the child may begin to acquire a feeling for the kinds of language that he can expect to find in books.

Some of his oral language is unlikely to be found in books, some will be found and some new features that occur in books will be very rarely or never heard in his speech. (Clay, 1991, p. 73)

Although not entirely the same, similarities do exist between spoken and written language, suggesting that the acquisition of speech and written genres would emerge and develop in a similar manner. As young children become increasingly exposed to print, they are learning about a variety of written language genres and simultaneously developing competence with the new language features contained therein.

Oral Language

Oral language consists of a variety of forms ranging from informal, everyday jargon to formal, specialized speech. Verbal communication consists of a variety of structures from casual conversation to the prescribed, scripted responses as in a church liturgy. Speech genres are “typical situations of speech communication” (Bakhtin, 1986, p. 87). A particular occasion, situation, or purpose determines the speech genres that an individual might use. For example, informal or casual conversation takes place between friends sharing a meal; discussions at a professional conference may be more formal and technically oriented.

The acquisition of oral language begins before children come to school (Clay, 1991; Genishi & Dyson, 1984; Heath, 1983; Lindfors, 1987). During their pre-school years most children acquire a variety of oral registers, or speech genres, for

communicating with others in a variety of social situations, for a variety of purposes (Chapman, 1994; Dandy, 1991; Genishi & Dyson, 1984; Lindfors, 1987). They talk with their friends on the playground one way, and their school principal in another (and very different) manner. The repertoire of oral language registers acquired in early childhood continues to develop and expand throughout a child's years in school. Children must learn how and when and with whom to use these various speech genres (Dandy, 1991; DeStefano, 1978; Lindfors, 1987) in ways that our culture deems appropriate, if they are to participate as capable and competent members in society as well as the classroom (IRA/NCTE & Assessment, 1994; Kamberelis & Greene, 1992).

Written Language

Written texts are comprised of a myriad of speech genres as well. Textual discourse patterns vary according to the purpose for which they are intended (Smith, 1988). The structures of an article in a research journal, a recipe in a cookbook, or a comic strip may be distinguished from each other by their unique terminology, composition, and format designed to suit their specific purpose.

When engaged in spoken language participants have the advantage of a shared physical situation, providing a nonlinguistic context (Wells, 1986), that enhances understanding between the speakers. Opportunities to confirm what has been said or to clear up misunderstandings can be sorted out as the participants interact within the context of a relevant situation. Children's early oral experience with expository types of information tends to be of this contextually (and personally) relevant kind (Spiro et al.,

1980). Several years our son Drew wanted to build a bookcase. He had never used a saw or level, two tools needed to complete the project successfully. Before he began the project, my husband George explained and demonstrated how to use the tools. George's physical demonstration enhanced his verbal directives in a context that was relevant and meaningful, enabling Drew to construct his bookcase.

Written text is designed to be communicated over time and space (Purcell-Gates, 1996), without the advantage of a shared physical context. Typically, an author, in a nameless location, generates a text represented by graphic symbols that are arranged on a surface to be read at a later time by a presumably unknown reader. The "contextual bases for achieving mutual comprehension that exist in speech" (Wood, 1998, p. 184) are not available. Print is used to "create a world of meaning" (Wells, 1986, pp. 155-156); print provides the context for understanding. Children's experience with and knowledge of a variety of written genres can facilitate comprehending a message that was created by an unknown author in another time and place.

Connecting Oral and Written Language

Written text is not oral language put to paper; we do not speak the same way we write (Clay, 1991; DeStefano, 1978; Wood, 1998). Even though the structures of oral and written discourse differ, the ability to control and be familiar with a variety of oral language structures will make it easier for children to work with the more formal discourse structures found in print (Clay, 1991). Langer (1985) hypothesized that in the early stages of literacy children use the "functional forms" of language that they hear

most often as models to structure their reading and writing. Familiar structures of oral language can be drawn upon to access the structures encountered when reading (Clay, 1991; Pappas, 1991) or generated when writing (Chapman, 1994).

Christine Pappas (1991) examined kindergarten children's repeated "pretend readings" of informational books. Over three consecutive days the children were asked to "read" an information book and a storybook after hearing an adult read it. Although children initially used illustrations to support their "readings" their pretend readings progressively sounded more like the language comprising the text. The children were able to connect oral to written language by using the novel language structures they heard the researcher read and replicate those structures in their pretend readings.

Chapman (1994) examined writing samples produced by first-grade children during a writer's workshop. The writing samples provided evidence that the students were pulling from their oral language repertoire to generate written compositions. For example, the oral discourse structure used to describe their drawings was similar to the structure presented in their attribute series writing. She defined attribute series as one-clause comments, attributes or attitudes about a topic, usually related in a random order. Overgeneralization of verbs used in speech was evident in their writing as well.

Summary

Oral and written language is comprised of a variety of speech genres or language registers designed for specific communicative purposes. Written language poses challenges for readers; it lacks the "nonlinguistic context" present in spoken language. Knowledge of written genres facilitates understanding; therefore, it is essential that

children develop an understanding of the purposes and functions of a variety of written genres to participate effectively in the classroom and as adult members in a literate society.

Young children acquire and use a variety of oral language registers; each is designed to serve a specific purpose in a particular situation. Written language consists of a variety of genres containing specific language structures designated by the purpose of the text. Although oral and written languages differ, it appears that children are able to apply familiar and recently heard genres from their oral language to read and write both narrative and informational texts.

Reading Processes

Reading is a complex activity; a variety of models and theories has been developed to explain the complex processes involved in reading and understanding written language. The interactive model of the reading process, parallel and successive processing and views of comprehension relate to the questions posed in this research study. They are discussed in the following sections.

Interactive Model of the Reading Process

“Reading is the process of understanding written language” (Rumelhart, 1994, p. 864). In order to understand written language a reader must make use of different sources of information: sensory, syntactic, semantic and pragmatic. These sources “interact in many complex ways during the process of reading” (p. 864).

David Rumelhart (1994) developed an interactive model to illustrate the reading process. He described how skilled readers make use of six information or knowledge

sources in an active “decision taking” process in order to understand written language (Clay, 2001). Although Rumelhart’s model begins with the most basic level found in text -- *featural knowledge*, and progresses to the most complex -- *semantic or discourse knowledge*, use of these sources does not necessarily occur in a linear fashion.

Hypotheses may be made from either a bottom-up mode, beginning with the most basic level or a top-down mode, beginning with a more complex level or from several levels at once. He explained that “all these knowledge sources apply simultaneously and that our perceptions are the product of the simultaneous interactions among all of them” (p. 877). This “highly interactive parallel processing system” (p. 889) interconnects hypotheses formed by these independent knowledge sources. Each knowledge source contains specific knowledge about a particular aspect of the reading process. A message center in the brain keeps a “running list” of the hypotheses made about the text. Each knowledge source checks the message center for its own particular type of knowledge. When a hypothesis is made with one knowledge source, other knowledge sources must be used to confirm, disconfirm, or alter the original hypothesis and make a decision .

Rumelhart’s Interactive Model explains what a skilled reader does when reading. Marie Clay (2001) describes implications for beginning readers, who are gaining control of literacy behaviors, within the framework of his interactive model. The points are specified in Table 1. The following section consists of a discussion of Rumelhart’s model along with some considerations concerning beginning readers expressed by Marie Clay.

Table 1

Interactive Model of Reading: Skilled and Beginning Readers

Knowledge Source	Skilled Readers	Beginning Readers
Featural	Discriminate minute characteristics of letters.	Discrimination may be difficult for children who know only a few letters.
Letter-level	Features are scanned to identify letters.	Learning to distinguish all of the letters from each other is a slow process. Known letters can provide footholds in continuous text.
Letter-cluster knowledge	Letter sequences or chunks that form units in the English language.	Easier for readers to learn; analogies can help children go from known to new words.
Lexical-level	Linguistic units – words, word compound; lexical item.	It may be difficult to distinguish letters from words.
Syntactic	Patterns or structure of word order.	Oral language can lead to more awareness of written language structures.
Semantic	Meaning.	Individual differences and knowledge may reflect how children construct meaning from written text.

Interactive Model of Reading: Knowledge Sources

1. *Featural knowledge.* Features are the details that distinguish one letter from another; they are the “basic level of processing” (Rumelhart, 1994, p. 886). Many letters have similar features with minute characteristics that distinguish them from each other. For example E and F are similar letters that are distinguished by one feature, the horizontal line on the bottom.

Beginning readers. Discrimination between features can be difficult for children who know only few letters or features as they are learning how to read (Clay, 2001).

2. Letter-level knowledge. “Feature inputs” are used to form a hypothesis about a letter’s identity when a close match to a letter is found (Rumelhart, 1994). For example, scanning the features  might result in a hypothesis and subsequent identification of the letter **H**.

Beginning readers. Clay (2001) notes letter-level considerations for beginning readers:

Learning to identify as distinct entities all letter forms used in English is a large set of visual perception learning and takes place slowly as new forms are successfully distinguished from known ones. Known letters provide footholds of one kind in continuous text once children begin to read and write and before they have mastered the entire set of letter knowledge. (p. 109)

3. Letter-cluster knowledge. This knowledge source looks for letter sequences that are likely to form units in the language or for individual letters that are likely to precede or follow other letters (Rumelhart, 1994). Rumelhart provides an example: if a reader recognizes the letter *q*, a likely hypothesis would be that *u* will follow it, since the letter cluster *qu* is typical in the English language.

Beginning readers. Clay (2001) refers to Bryant and Bradley’s research on *rime* that “provides evidence of how children use an aural ‘clustering’ of sounds within a word... [suggesting] that readers can search for and use chunks quite easily” (p. 109). Rime refers to the rhyming part of a word (Clay, 1993b), such as *ook* in *book* and *look* or *it* in *hit* or *fit*. Attending to letters as clusters or chunks enables children to solve unknown words when reading or writing by finding analogies – using the known cluster to solve a

new word (Clay, 2001). For example, knowledge of the cluster *at* in the word *cat*, might help a reader to solve the unknown word *sat*. “It probably saves effort or processing time to get quickly to something new using a chunk of something already known” (Clay, 2001, p. 109).

4. Lexical-level knowledge. A lexical item may be defined as “a linguistic unit with one or more morphemes and with a specific pronunciation and meaning, as a word, word compound or idiom; lexeme; vocabulary item” (Harris & Hodges, 1995, p. 138). Clay (2001) refers to Rumelhart’s lexical-level knowledge as word knowledge. The knowledge of a word, its meaning, pronunciation and possible letter, and letter cluster sequences enables readers to evaluate hypotheses to identify words (Rumelhart, 1994).

Beginning readers. “The words read are the vehicles for using letter-feature, letter-sound, and letter-cluster knowledge to clinch decisions” (Clay, 2001, p. 109). Beginning readers are just learning to differentiate letters from words and may find it difficult to discriminate between the two.

5. Syntactic knowledge. Syntax refers to “the pattern or structure of word order in sentences, clauses, and phrases” (Harris & Hodges, 1995, p. 249). For example in the English language adjectives precede nouns – *the red dress*. Inflections also are determined by syntactical conventions as well (Clay, 2001).

Beginning readers. “The phrases children construct in their conversations lead to more awareness of language structures within sentences in their writing and reading” (Clay, 2001, p. 110). Syntactical decision making is influenced by children’s spoken

language, sentence beginnings, punctuation, intonation and expression, and phrased and fluent reading.

6. Semantic-level knowledge. Semantics denotes “meaning in language” (Harris & Hodges, 1995). Semantic cues provide “evidence from the general sense of meaning of a written or spoken communication that aids in the identification of an unknown word” (Harris & Hodges, 1995, p. 229). This knowledge source must be able to establish if hypotheses made at both the lexical and syntactic levels are possible (Rumelhart, 1994).

Beginning readers. “All readers have to construct meaning to comprehend text” (Clay, 2001, p. 111). Young children enter school from diverse social and cultural backgrounds with differing perceptions and knowledge of the world (Clay, 2001). Their preschool experiences with printed materials vary, in terms of time - amount of contact with written materials, and variety - types of genres. “The individual differences in knowledge about literacy are multiplied when we consider the additional differences in knowledge of the world that the reader must bring to the reading and comprehension of texts” (Clay, 2001, p. 116).

Clay (2001) includes discourse knowledge in this level as well. She refers to stories and how a developed sense of stories, or story knowledge supports reading in that genre. She notes that genre theorists warn that expertise in story reading does not necessarily correspond to expertise when reading informational genres. Knowledge of how a specific genre works will assist a reader’s ability to comprehend novel text.

Parallel and Successive Processing

Processing refers to the way a reader uses and relates information accessed from a variety of sources, both within and outside of the text, to understand the message (Clay, 1991). Parallel and successive processing denote the child's use of knowledge sources to facilitate the reading process and the attention given to the task.

Parallel processing signifies the simultaneous use of multiple knowledge sources that is characteristic of a "highly interactive parallel processing system" (Rumelhart, 1994). Parallel processing occurs when reading is accurate with no overt attempts at problem solving. Erica read the sentences *Fish lay eggs* and *Snails lay eggs* accurately the first time, with no apparent difficulty. The "simultaneous direction of attention" is characteristic of a system that economizes attention (N. Anderson, personal communication March 30, 2004).

Parallel processing is an indication that little attention is directed toward solving words; reading is proceeding smoothly, without apparent effort. Errors that sound like correct reading the first time indicate parallel processing as well. Erica's substitution *they/their* indicates parallel processing.

Child: Mosquitoes do not look after they eggs.
Text: Mosquitoes do not look after their eggs.

She accessed information at the letter-level, letter-cluster, and word-levels; the error is also meaningful. Erica used several knowledge sources simultaneously when she made the substitution.

Successive processing is applied by young children as they learn to become readers. Instead of accessing or using information from several sources they sometimes attend to one piece of information at a time in a series of actions (Clay, 2001).

Erica made successive attempts when trying to solve *most*.

Child: Mommy, m-ost, must

Text: Most

Initially she substituted *mommy/most*. When word-level knowledge did not match, she attempted a sound analysis at the letter and letter-cluster levels. Her final substitution indicates that Erica used knowledge sources at the feature, letter, letter-cluster and word-levels. The substitution was also grammatical and meaningful. Erica made successive attempts as she tried to solve *most*.

Parallel and successive processing reflect the attention that is directed toward the act of reading a text. Knowledge sources are used simultaneously in parallel processing and separately with a series of actions in successive processing.

Comprehension

Comprehension or comprehending is a process that the reader engages in during reading to construct meaning (M. R. Ruddell, 1994) or “make sense of the text” (Goodman, 1994). Readers use information from a variety of sources (Clay, 1991; Goodman, 1994; Rumelhart, 1994) including prior knowledge of a topic or subject matter; life experiences; knowledge of oral and written language structures; and phonetic and orthographic knowledge. Comprehension or comprehending is dependent on what the reader knows before reading (Goodman, 1994). Comprehension may change:

Comprehending is a “constructive process in which readers make sense of text, it goes on during reading and even long afterwards as the reader reconsiders and reconstructs what has been comprehended” (Goodman, 1994).

Consider the following excerpt from a memorandum written by G. C. Robinson (1974):

A raw material to be suitable for the manufacture of lightweight aggregate should have three qualities – pyroplasticity, entrapment, and gas formers. Pyroplasticity refers to the characteristic of many materials becoming plastic after they become hot. They behave much as a piece of iron does when you get it red hot and can hammer it into a new shape. It is necessary for a material to develop this pyroplasticity in order for it to bloat and produce a lightweight aggregate. (p. 1)

What a reader is able to comprehend is dependent on what is known before reading. Understanding or comprehending the passage above is dependent on your knowledge of aggregates and the manufacturing processes implemented to produce the lightweight aggregate. As you first read the passage you may not have known what lightweight aggregate is. The three terms designating the qualities suitable for the manufacturing process may have perplexed you even more; pyroplasticity being one of them. However, as you read on you discovered the author’s comparison of pyroplasticity to hot iron; knowledge of what red hot iron is like has caused your comprehending to shift. You now comprehend that a certain raw material must have the characteristic of pyroplasticity - becoming hot and pliable, to be manufactured effectively.

Comprehension may change after reading as meaning is reconstructed. Suppose you had never heard the term aggregate, but subsequently learn that aggregates are a raw material mined from the earth. Crushed stone, sand, and gravel are aggregates. You surmise that a manufacturing process produces a lightweight aggregate that is lighter in weight than regular aggregate. Your comprehending has shifted after reading; meaning was reconstructed.¹

Comprehending is a process that occurs during reading to make sense of what was read and continues after reading. What an individual knows or comprehends before reading is changed or processed, as a reader comprehends new concepts both during and after reading.

Summary

Analysis of oral reading can provide valuable insights about a child's knowledge of letters, words, syntax and semantics and how a child integrates these sources to understand what is being read. This is particularly important for the teacher of beginning readers, who can reflect on recorded observations and subsequently plan instruction designed to promote a child's developing repertoire of knowledge sources and the ability to integrate them while reading.

¹ When the aggregate is heated to a point, where it is softened, like bubble gum – pyroplasticity, it can be reshaped. Aggregates are fed into a rotary kiln, where they are heated, expanded and reshaped making them up to 40% lighter in weight than ordinary aggregates. Lightweight aggregate is used as construction materials on road surfaces, in roof tile, lightweight block and lightweight concrete (G.E. Eure, personal communication, April 2004).

“When a word requires problem-solving [proficient readers] will shift quickly among meaning, letters, sound and structure, choosing between alternatives … They are making links within and across the linear text using different kinds of stored knowledge” (Clay, 2001, p. 122). Beginning readers are still developing their repertoire of knowledge sources and have limited knowledge within each one (Clay, 2001) and limited ability to use multiple sources either simultaneously, as with parallel processing or to check one source against another to establish the plausibility of their hypotheses.

What is known before reading influences comprehension during reading.

Comprehending continues after reading as meaning may be reconstructed.

Assumptions about Text Structure

It has been assumed that narrative texts should be the primary means by which children learn to read and write. The following section relates some views concerning that premise and why reading and writing expository texts may be more difficult for some children.

Why Narrative

Children’s language and literacy development was traced in a longitudinal study conducted by Wells (1986). The study began when the children were approximately 15 months old and concluded at the end of their elementary school education. The results caused him to postulate that stories should be the primary means of teaching children how to read and write. As young children interact with others they relate and hear stories in conversation, in books read, or stories told to them, and through dramatic play.

Children learn the enormous “facilitating power” (p. 26) of language through the

stories that they hear and share with others. Therefore, when learning about printed language, new ideas and concepts will be easier to understand when they are presented in a story format. Wells suggested that moving children from a “narrative mode of expression to an expository or argumentative one” (p. 205) be a gradual process.

Egan (1988) advised that stories should be used as the primary component in early childhood curriculum. The affective nature of stories has the capacity to stimulate a child’s emotions and thereby “develop the imagination” (p. 123). As children learn the “underlying grammar” of stories a sense of coherence and connectedness is developed, and when children put events or episodes together in a story they develop an awareness that sequence in stories is produced by particular rules. Children are drawn into stories by the ecstasy and delight generated as they learn more about their world: its people, places, plants and animals, and the norms and values deemed significant in their culture and the cultures of others.

Written language is not speech put to paper. Frank Smith (1994) suggested reading stories aloud to children that are not yet able to read so they may begin to differentiate between oral and written language. They must learn how print works in order to predict and subsequently comprehend written materials. Hearing stories read aloud should be the means to “familiarize children with written language” (p. 207), facilitating the ability to distinguish between oral and written language. Children will then be able to effectively predict and comprehend printed language as they develop control over their own reading and writing.

Why Expository Genres May be Difficult

Children may be successful and enjoy reading stories, yet many students find reading and writing expository text difficult (NAEP, 1995). Luke (1991) proposed that “perhaps students’ inability to read and write expository prose in secondary schools is induced by inter alia, the near exclusive emphasis in literacy teaching on the non-critical reading of narrative (e.g., recall) and the writing of narrative” (p. 141). There are, however, some characteristics that may make informational texts harder to read for some children. They include syntactical or grammatical structures; technical vocabulary; specific topical concepts; and level of difficulty.

The grammatical structures comprising informational and narrative texts are different and the structures inherent in expository texts may be less familiar to children, making them harder to read (Spiro et al., 1980). Informational texts are often written in a passive rather than active voice and connectives, such as “in other words” are more complex than those in stories. Longer sentences often found in expository materials may present difficulties for young readers (Spiro et al., 1980). Yet the fourth grade students in Alverman’s (1982) study did not perceive sentence length as being particularly difficult but did relate that dialogue (found in many stories) was an “aid to understanding” (p. 300).

Children may have more difficulty reading expository text because their structural schemata for stories are more fully developed. Stories tend to contain common or natural language structures (Spiro et al., 1980). Knowledge of those forms facilitates comprehension whereas expository text has a “greater variety of structures because it

tends to be about a greater variety of things, with different structures best fitting each thing” (Spiro et al., p. 10).

The “content-specific concepts” (Musthafa, 1996) and vocabulary found in expository texts are often a source of difficulty for children (Spiro et al., 1980). For example, Erica and Carley were unable to solve *mosquitoes* in the book What Lays Eggs? (Gracestone, 1998). When they came across the text, *Mosquitoes lay eggs*; they had difficulty and were told the word. Fourth grade students perceived nonfiction as harder than fiction and cited vocabulary or ‘hard words’ as the main reason (Perry, 2001). The technical language found in the nonfiction books posed the most difficulty for Reading Recovery boys who either appealed for help or relied on only one source of information to solve the unknown words (Scott, 2000). First grade students reported that ‘hard’ words were the most difficult aspect of reading information books (Garrick, 1992). However, fourth grade students did not maintain that “harder words” made nonfiction more difficult to read (Alverman & Boothby, 1982).

“Common central concerns are much more likely to be found in stories” (Spiro et al., 1980, p. 10). Stories are often about people and their goals; children may be more familiar with the content of stories, rather than the content of nonfiction which is about a multitude of topics (Spiro et al., 1980). Fourth grade students concurred, stating that narrative is easier mainly because of “content familiarity” (Alverman & Boothby, 1982).

Readability formulas confirm that content area or informational books are “written at a more difficult level than basal reader stories” (Spiro et al., 1980). Equally leveled books are not equally as easy to read, posing another hardship for young readers.

Summary

Some scholars believe that narrative genres should be the primary means by which children learn to read. Their rationale being that the stories heard and spoken in conversation are similar to the written stories that can capture and stimulate a child’s imagination. Syntactical and grammatical structures, vocabulary, concepts, and level of difficulty may contribute to children’s difficulty reading informational texts. However, an early narrative emphasis with insufficient time to explore other genres may be another reason why nonfiction is perceived to be the more difficult genre to read.

Reading and Writing Expository Genres

In the primary years, children develop an awareness that written language changes according to its purpose or function just as their spoken language does. Donovan and Smolkin (2002) explored children’s genre knowledge by asking children in kindergarten and first grade to discuss the differences between stories and informational texts; second through fifth grade students wrote their responses. Most of the kindergarten children were unable to explain what those differences were while many of the first grade students were able to distinguish between the two genres. The older students were able to identify the differences with elaboration. The majority of students across the grade levels, including the kindergarten children, defined an information book as “information about” or “truth

about” a subject and the majority of students were able to define storybooks. Although they were unable to explain the differences between storybooks and informational texts, young children gave definitions for each separate genre, revealing a budding awareness that written genres serve specific purposes.

Early Reading

Co-referentiality in storybooks refers to the cohesive elements in the text used to create unity. In Curious George (Rey, 1941), *he, his* and *him* all refer to one specific subject - George. *Co-classification* is used to form a classification chain referring back to a class of animals or objects, rather than a single subject. For example in Catch Me If You Can! The Roadrunner (Chukran, 2000) *it, they, this fast bird*, all refer to roadrunners. Pappas (1993) analyzed kindergarten children’s pretend readings of stories and information books to compare their use of co-referentiality in stories and co-classification aspects of informational texts. She discovered that the children were successful reading both genres and their ability to sustain co-referentiality and co-classification improved over the three sessions in which they participated.

Lexical items in stories “[relate] to the intentions and reactions to the attempts of characters to resolve conflicts or problems” (p. 105) or may include “common sense vocabulary” about familiar “everyday objects” (Pappas, 1993, cites Martin, 1990).

Lexical items in Curious George include a *hat, balloons, and fire engines*.

Informational books convey items technically (Pappas, 1993) in terms of their dictionary or lexical meanings (Harris & Hodges, 1995). Examples from Catch Me If You Can! The Roadrunner (Chukran, 2000) include *prey, digested, predators*. In the study mentioned

above, Pappas (1993) explored how children learn lexical items in stories and informational texts. She analyzed children's ability to acquire lexical items in each of the two genres. The results of this study indicated that children were equally successful, regarding their use of lexical items, when reenacting both types of written discourse.

Kindergarten children applied specific strategies when reenacting informational text (Pappas, 1991, 1993). One strategy was the use of *placeholders*. Placeholders are ways to deal with specific technical terms in informational texts. The substitutions *okra* for *orca* or *swall* for *swallow* are examples of placeholders. Pappas explained *over extension* as a strategy used to maintain the co-classification feature found in expository texts. An example is the repeated substitution of *dogs* or *they* for the author's, a *dog*, in an effort to maintain continuity. The children in her study supplied grammatically similar substitutions and over extended "linguistic devices". Pappas concluded that learning to read informational text is a "meaning driven, constructive process" (Pappas, 1991, p. 222) similar to the acquisition of a sense of story genre.

As children are gaining control over literacy learning they begin to develop strategies to solve unknown words when reading. During reading conference interviews, first grade students related strategies they used to read and comprehend expository text (Garrick, 1992). Graphophonic refers to the "sound relationships between the orthography [spelling system] and phonology [speech sounds] of a language" (Harris & Hodges, 1995, p. 101). Garrick learned that her students most frequently use the graphophonic cuing system by sounding out a word or reading part of word. Accessing and using prior knowledge, support from illustrations and context clues were mentioned

as well. Their responses indicated that children do actively apply problem-solving strategies to construct meaning in the expository texts they read.

Scott (2000) analyzed boys' text reading during Reading Recovery lessons. She examined the records to explain and compare strategies they used to read fiction and nonfiction books. The analysis of errors indicated that for more than half of the boys the "reading style" remained nearly the same when reading books in either genre; they used the same sources of information to "predict, monitor, regulate and confirm" their reading (p. 38). For example, if a child relied heavily on meaning and structural information in fiction, he did the same in nonfiction. Accuracy levels, calculated at the same level of text revealed that non-fiction was harder for the majority of the boys.

Houge (2000) used paired-topic texts to explore how second grade male students read and write narrative and expository texts. The boys were asked to read and then write about the book they had just read. Their written retellings imitated the language structures presented in the books. The boys demonstrated the ability to "[process] the linguistic structures" (p. 158) of both expository and narrative texts when reading and to incorporate those distinct structures in their writing. The retellings revealed that the students comprehended and summarized what they had read while "recognizing details they regarded as significant" (p. 160) for both the narrative and expository texts. The findings led him to suggest that comparing similarities and differences of a variety of text types, through reading and writing, will enable elementary students to develop a better understanding of the specific purposes and functions of each.

First grade children presented an oral retelling of an information book heard during a read aloud session. The children were “readily able to summarize text information, identify information they considered important, and provide opinions and rationales for those opinions” (Moss, 1997, p. 11). Many of the students made inferences beyond and extending from the text as well. She concluded that these students comprehended the concepts presented in the book and suggested that exposure to expository texts at a young age might facilitate children’s ability to understand the genre.

Early Writing

It appears that beginning readers may have an awareness of specific written genres as shown by their attempts to apply specific language structures in their writing. Newkirk (1987) examined the nonnarrative writing of first, second, and third grade children and found that most early writing was in the form of lists; the writing was not imitative of oral language (informational text generally is not). He hypothesized, “exposition may well begin not as speech written down, but as the appropriation and extension of dominant *literate* forms – the list and the label” (p. 141). Typically adults write expository texts such as compiling lists or filling out forms. Young children’s early writing is based on the adult forms: the known written structures with which they are familiar (Newkirk, 1987).

Observations in a first grade classroom revealed that the majority of children’s early writing was not narrative but resembled a list compiled in sentence form (Sowers, 1985). The students began the year writing “all about” books. Typically, these list-like books contain a “collection of facts, features, and attributes of its subject” (p. 73). “All

about” books outnumbered narrative texts early in the year by approximately two-to-one. As the year progressed they were increasingly replaced by the narrative genre and by the end of the year, three times as many narratives were produced. Chapman (1994) discovered a similar situation when she explored first grade children’s writing. Early in the school year the children integrated talking, drawing, and writing to produce mostly nonchronological genres. During the course of the year nonchronological writing evolved into narrative, “contradicting a commonly held belief that narrative is more suitable or perhaps easier for primary children than nonnarrative” (p. 375). Detailed analyses of classroom discourse and writing samples composed during writer’s workshop indicated that young children are capable of writing in a variety of genres (Chapman, 1995) about a variety of topics. The first grade students in this classroom, wrote about personal experiences, “imaginary worlds” (p. 188) and experimented with words and ideas drawing on the genres they used in their classroom as models for their writing.

Kindergarten and first grade children read their written texts composed in three different genres: shopping lists, personal letters, and stories (Zecker, 1996). The children demonstrated knowledge of all three genres and their “readings” indicated that the shopping list genre was the best defined and well known of the three. The findings in this study

provide support to the position that challenges the notion that most early writing is basically narrative in nature, or that the narrative is the most adequate – or primary-type genre when working with beginning readers and writers (refers to

Newkirk, 1989 and Pappas 1990).... narrative was the least *natural* among kindergartners and first graders. (p. 17)

Donovan (2001) described the writing of elementary school children from kindergarten through fifth grade. She asked kindergarten and first grade students to “read, or pretend to read” a story and an informational book that they had previously been requested to write. Analysis of the story and informational reading and writing revealed that these students composed distinct texts “to varying degrees” (p. 394). Half of the children produced texts that could be regarded as informational. The younger children wrote informational texts above the simple levels of labels and statements: approximately half of kindergarten, first and second grade children included the more complex Attribute Lists in their texts as well. The young children in this study demonstrated the ability to make a distinction between the genres, including elements of structural complexity in the informational texts they produced.

Kindergarten, first and second grade students created and composed a story, science report, and poem (Kamberelis, 1999). Kamberelis discovered that across grade levels, most of the children wrote “reasonably well-formed” stories (p. 422). The science reports were less prototypic than the stories: they did not resemble typical examples of the genre. *Rhetorical effectiveness* refers to the ability to communicate effectively with language (Harris & Hodges, 1995). The children in the study were able to incorporate the textual structures and language registers characteristic of stories in their writing more effectively than they could with the informational structures used in the science report: story writing was more rhetorically effective than the science report. Kamberelis noticed

that some children in each grade level produced “sophisticated tokens” of some or all of the genres while others produced “atypical tokens”. Finally, some students produced “hybrid tokens” of some or all genres as in the atypical science reports that included narrative qualities. He concluded that the children had “considerable (but not comparable) working knowledge of narrative, informational and poetic genres” (p. 445). However, their knowledge of narrative texts was more fully developed, and knowledge of science reports or poems was still developing .

Summary

The results of the research reviewed above indicate that young children are able to identify and define the purposes for informational and narrative texts. Kindergarten children are able to use textual features and structures to pretend read and older students are able to incorporate distinct generic structures they read into their writing. Primary children pretending to read are strategic, demonstrating the ability to apply specific strategies, such as using placeholders, to solve novel words. Young children are able to summarize and make inferences following read alouds, indicating an ability to construct meaning in their early reading efforts.

Children’s early writing indicates that in the primary years, awareness of, and proficiency with multiple genres is developing. Early writing begins as informational, imitating the written forms children see in their home environment. In school, children draw on the genres used in their classrooms to write a variety of genres with distinct structures and varying degrees of complexity. Expertise with informational writing seems

to fade quickly as children's story writing becomes more fully developed – perhaps due to a narrative emphasis highlighted in many classrooms.

Experience and Instruction with Informational Genres

As children develop as readers and writers they become more proficient in their ability to read and write texts of increasing complexity in a variety of genres. Time, experience, and instructional practices may shape young children's developing proficiency with informational texts.

Developing Proficiency: Change Over Time

Many changes occur in children's literacy behaviors during the primary years when they are learning to read and write. As children progress through these early years they develop increasing control over literacy learning (Clay, 1991). The following section traces the changes over time that occur as children explore ways to read and write distinct genres.

Chapman (1995) researched the changes that take place in first grade children's writing during the course of the school year. She discovered that the writing produced by six children in writer's workshop changed both quantitatively and qualitatively regarding genre over the course of the year. During the first term the children wrote approximately "four-to-six" different genres; the number increased in the second term to approximately "nine-to-fourteen" different genres. Chapman classified the writing into four major categories: chronologies, interactions, descriptions, and word plays. Throughout the year writing in all categories became more complex, although it did not develop in a linear

direction. Non-chronological writing began as simple labels and evolved into hierachal attribute series containing a main clause and related subtopics.

Zecker (1996) asked beginning readers in kindergarten and first grade to write, and then read texts characteristic of three different genres: shopping lists, personal letters, and stories. Oral reading of their writing indicated that throughout the year the children in both grades “showed improved knowledge of specific genre characteristics” (p. 14) for each of the genres they were asked to write. In the fall 68% of the kindergarten children produced a personal letter and by the spring 85% were able to do so. During the course of a school year young children’s knowledge of genre development was evident in the increasing complexity of their writing.

Children in kindergarten, first and second grade wrote texts in three different genres: stories, science reports, and poems. Analyses of their writing revealed that “there was a general tendency for the first and second-grade children to produce more prototypic and rhetorically powerful stories, science reports, and poems than the kindergarten children” (Kamberelis, 1999, p. 433). Kamberelis and Bovino (1999) analyzed several textual, organizational and structural features of young children’s narrative and informational writing. They concluded that all of the children had a “fairly good grip” of conventions for narrative, but knowledge of informational text was still developing. In scaffolded as well as nonscaffolded writing tasks they discovered that performance “increased systematically as a function of grade with most gains occurring between first and second grade” (p. 161).

Stories and informational texts are comprised of *global elements*. Global elements include obligatory elements that must be included in the text and optional elements that are not necessary but may be included (Pappas, Kiefer, & Levstik, 1999).

Hasan's scheme (Pappas et al., 1999) for global elements in storybooks consists of Obligatory Elements:

1. Initiating Event- the conflict or the problem emerges.
2. Sequent Event – recounts the characters' attempts to resolve the conflict or problem.
3. Final Event – problem or conflict is resolved.

Optional storybook elements include:

1. Placement – places characters in a time or locale; detailed descriptions of characters are presented, such as what they talk about or habitually do.
2. Finale – restores the habitual state of affairs; back to normalcy.
3. Moral – a moral statement.

Obligatory Elements in informational books are described by Pappas:

1. Topic Presentation – introduction of the book's topic.
2. Description of Attributes – describes the attributes of the class or book's topic.
3. Characteristic Events – expresses characteristic or typical events and processes.
4. Final Summary – summarizes the information presented in the book.

Optional Elements in informational books are:

1. Category Comparison – compares or discusses different aspects of categories or classes presented in a book.
2. Afterward – includes extra information about the book’s topic.

Donovan (2001) analyzed informational and story writing of children in kindergarten through fifth grade. She noticed “grade related patterns” (p. 426) regarding the use of the global elements specific to each genre. As children got older their informational texts included “a greater combination” (p. 426) of the obligatory global elements of expository text as defined by Pappas. Grade level variations also were evident in the organizational complexity of the students’ expository writing: shifting from simple structures, such as labels (which later disappeared), in early writing, to the complex structures of ordered paragraphs in the upper grades. In a case study of her son Paul, Bissex (1979) found that his newspaper writing “moved from a very partial and global sense” (p. 6) of production at 5:7 years to “much more differentiated, precisely imitated and realistic versions” (p. 6) at 9:1 years of age. Over a span of several years, children’s expository writing shifted from simple structural and organizational features to more complex ones that resembled conventional forms.

Newkirk (1987) examined the coherence of non-narrative writing of children in grades one, two, and three. The results of the study indicated that children in the upper grades were more adept with incorporating and maintaining cohesion among statements than the first grade children. First grade children included more labels and attribute series

in their writing; none of the third grade students used labels and the majority incorporated hierachal attribute series and paragraphs in their compositions. Newkirk advised that we should not view children's early attempts at expository writing as deficient; instead we should view their "successful approximations" as evidence of their continuing literacy development (Clay, 1993b; Newkirk, 1987).

Langer (1985) examined third, sixth, and ninth grade children's writing and retellings to discover how they organized story and academic report structures. Her findings indicated that as children get older they write longer papers with greater syntactic and rhetorical complexity with increased control of genre-related organizational structures.

Instructional Practices

In the primary years of schooling children are developing control over reading and writing behaviors; instruction plays a central role in literacy development during this time of transition. The following section includes research that explores how instructional practices may influence the children's understanding of and proficiency with expository genres.

Scaffolding

Scaffolding refers to the assistance given to a child by an adult to help a child complete a task that the child would be unable to complete alone. The assistance is designed to facilitate mental change that "nudges" a child to the next level of functioning (Wood, 1998; Wood, Bruner, & Ross, 1976). Donovan and Smolkin (2002) analyzed the

effect of scaffolding on children's writing in kindergarten through fifth grade (kindergarten and first grade children were asked to write or pretend to write). They discovered that the children used familiar texts to support their writing. For example, a kindergarten child incorporated a cartoon character into his story and a fourth grade student explained that her writing was based on something she had previously read or written. The children created their own scaffolds by making relationships with previously known texts, to generate new ones.

Likewise, Kamberelis and Bovino (1999) discovered the positive influence of using known texts as scaffolds for writing. Students in kindergarten, first and second grades completed nonscaffolded and scaffolded writing tasks. The nonscaffolded task required students to write a story and a factual science report about a topic they were familiar with. Children were asked to recall and write down from memory a well-known story or factual science report in the scaffolded task. "For children in all grades, science reports written in the nonscaffolded condition received particularly low ratings compared to those written in the scaffolded condition" (p. 161) suggesting that "artifacts as scaffolds" may facilitate development of children's ability to write partially known genres, in this instance, expository text.

Discussion

Horowitz (1995) explored the influence of discussion both before and after a teacher's oral reading of an information book and a storybook. She compared outcomes of kindergarten and second grade students who did not have the opportunity to discuss the books to those who did. Discussions helped the children to have a better

understanding of, and improved ability to interpret the author's message; consequently those students preferred the informational text over the storybook. She concluded that effective discussions surrounding oral reading may facilitate children's proficiency with informational genres and perhaps spark some interest in them as well.

Other Practices

Certain teaching practices and methods may have a positive influence on young children's ability to read expository texts. First grade students related the teaching practices and methods that helped them to develop strategies to read expository text (Garrick, 1992). They mentioned reading activities such as "reading other books"; frequent reading; participation in reading conferences and teacher read alouds as effective practices. Other activities included writing stories and thematic unit activities. Children were able to express what activities helped them learn how to read expository texts, indicating that they are able to develop competence with the genre if given the tools to do so.

Summary

Older students demonstrate more knowledge and greater proficiency with a variety of genres. As children get older, their written compositions increase in length and structural and organizational complexity. Narrative genres are more fully developed with younger children; however, the years between first and second grade seem to be a time of transition in children's writing, when knowledge of expository text is still developing.

The use of known texts as models or scaffolds appears to have a positive effect on children's ability to write a variety of genres. Specific instructional methods, such as

reading aloud, discussions and providing ample time to practice reading enhances reading effectiveness with informational texts. It has been suggested that children's expertise with narrative outweighs expertise with expository genres. However, the research cited above indicates that if beginning readers are taught how to read and write informational texts their expertise with the two genres may be comparable.

Multiple Genres in the Primary Years

Children acquire a variety of speaking genres simultaneously *as* they acquire language "in their social lives" (Musthafa, 1996). Children acquire the "social rules" of written genres through their environment as well (Musthafa, 1996), implying that acquisition of written genres occurs simultaneously *as* children learn how to read and write.

If we want children to develop into strategic and self-directed readers, we must provide them with an abundance of opportunities to read a variety of written genres as early as possible, so that they can continue developing the tacit knowledge of literacy they have acquired since their preschool age.
(Musthafa, 1996, p. 32)

Beginning readers should frequently engage in reading and writing a wide range of genres (Musthafa, 1996) as they are learning about print.

Genre Development and Literacy Progress

Donovan and Smolkin (2002) warn "a narrow focus on narrative in early school years may interrupt the development of reading and writing in multiple genres" (p. 428). A better balance, including a variety of genres, is called for in circumstances where there

is a surplus of narrative materials and when narrative texts are primarily used for reading instruction with beginning readers. Duke (1999) discovered a scarcity of informational texts in both high and low income first grade classrooms; low income classrooms contained the lowest proportions of informational genres. This disturbing situation is a “missed opportunity to prepare students for the informational reading and writing they will encounter in later schooling and life” (p. 25), especially for children who may not have the resources at home to compensate for the inadequate opportunities provided at school. An average of only 3.6 minutes a day was spent with informational texts. Duke suggested that “continued low levels of achievement in informational reading and writing should not be attributed solely to the difficulty of these forms of text” (p. 27) and hypothesized that lack of experience could also be a contributing factor.

Children’s selections from a “well-designed” first grade classroom library corresponded to availability (Smolkin et al., 2000): informational books comprised 36% of the classroom library and were selected 36% of the time overall. Boys selected a significantly higher percentage of information books than girls and the girls selected a significantly higher percentage of storybooks. The authors remarked that children will choose information books when they are made readily available in a well balanced classroom library. Language in informational texts can be structured in, nonnarrative or narrative story-like style. Higher percentages of students selected informational texts with nonnarrative structures suggesting that “even young children have considerable facility and comfort with a range of text structures” (p. 517), suggesting that information does not necessarily need to be presented in “story-like form”.

A narrative emphasis, in part, may be why kindergarten, first and second grade children demonstrated more knowledge of narrative texts in their written compositions and the younger students often wrote science reports and poems as narrative genres. The number of storybooks read by the children in these classrooms outnumbered the informational and poetry books by “more than five to one” (Kamberelis, 1999). Kamberelis concluded, “children’s literacy diets are not particularly well-balanced and may not be providing children with cultural staples requisite for optimal genre development and learning” (p. 452). Over exposure to one genre – narrative, may have limited the children’s ability to produce other genres: the science reports and poems.

Young children incorporated nonnarrative structures in their writing yet had difficulty with exposition in secondary school. Perhaps difficulty in later years is due to the exclusion of “serious instruction in (or study of) exposition in the elementary years” (Newkirk, 1987, p. 142). Newkirk suggested that narrative should not be the sole genre used in primary grades and recommended that throughout their early years in school, children be given the opportunity to write expository texts to minimize the difficulty with exposition as they get older.

Children need to understand that written language serves a communicative purpose and that text structures will vary according to their purpose or function (Pappas, 1993). Young children’s ability to reenact informational as well as narrative text structures indicates that they are able to use different written language structures, negating the “primacy of narrative” assumption (Pappas, 1993).

Many children's preschool experiences with print are with nonnarrative, informational materials. A narrative emphasis in the primary grades may be hampering children's reading and writing progress; the children may be unable to make connections between their home and school life. "Students too often have difficulty seeing the connection between school based texts and those in the community" (Luke, 1991, cites Heath, p. 137). Low-income families used print at home in the form of informational materials designed to serve a specific purpose: flyers, coupons, and container text such as, cereal boxes, milk cartons, and grocery lists (Purcell-Gates, 1996). Children whose early literacy experiences are primarily with functional informational print may fail to see the utility of the narratives used in their classrooms.

Beginning readers have a great deal to learn about written language, including learning the basic conventions about how print works; recognizing various organizational features; and becoming accustomed to different language structures presented in printed materials. It may be prudent to include more opportunities for students to use informational texts in the classroom, so they may take on this new learning in the context of what they already know from their preschool experiences. Caswell and Duke (1998) noticed that once the emphasis shifted from narrative to nonnarrative genres their two students became more active and purposeful readers and writers. Opportunities with nonnarrative texts positively influenced literacy development for these boys, causing the authors to call for "greater attention to non-narrative text in early literacy education" (p. 114). Nonnarrative forms of print, such as bills, maps, and newspapers were used regularly in the students' homes, suggesting that the use of nonnarrative texts in school

may have “provided a better match to the uses of literacy found in their homes” (p. 115) thereby accelerating the literacy progress of their struggling readers.

Luke (1991) questioned the advisability of a narrative emphasis.

Some educators would argue that there is something innately attractive about narrative to children. (refers to Egan, 1988) But why narrative? Is narrative a genre of power? In secondary schooling? In community life? Will it make one a better person? Raise ‘self-esteem’? To what end? How? (p. 136)

Luke suggested that we should teach students the “functional” genres that they will be expected to use in later life. As children progress through school, they are expected to read and write expository or informational text with more frequency. By the time students reach third and fourth grade, exposition, or content area materials become the primary genre used for reading and writing (Spiro et al., 1980). Therefore, reading and writing informational texts should be included early in a child’s schooling so by the time they reach the intermediate grades children will know how to use the genres they are expected to learn from.

Reader Stance

Rosenblatt (1994) developed a model that depicts reading as a transactional process; reading involves a transaction between the reader and the text. Meaning is constructed during the transaction a reader has with the printed message. Rosenblatt suggested that readers adopt particular stances when reading to help them construct meaning during this transaction. A reader adopts an *efferent stance* when reading to learn something. An *aesthetic stance* is more personal. A reader’s emotional involvement in

the text facilitates creating images from what is written and heightens awareness and understanding about the feelings, passions, and conflicts that emerge throughout the text.

Reader stance is a “selective attitude that expresses the reader’s intent or purpose and guides the reader’s attention” (Harris & Hodges, 1995, p. 241). A specific genre or type of text usually determines the predominant stance a reader chooses to assume. Readers can adopt both stances while reading a single piece of text. When Christopher was reading We Ski, (Gracestone, 1997) he yelled, “Geronimo!”, indicating his thrill at the idea of skiing down a mountain. Christopher became emotionally involved by assuming an aesthetic stance; at the same time he assumed an efferent stance to learn some new things about skiing.

Ample opportunities should be provided for emergent readers to be exposed to a variety of expository genres, stimulating their natural curiosity about “real things” so they might enjoy learning while reading informational texts.

Reader Preference

Children are naturally curious about the world they live in and want to know more about it (Bamford & Kristo, 2000). They want to learn more about their favorite baseball players, dinosaurs, or what is in outer space. Informational texts can be used to stimulate this natural curiosity as children find answers to their questions about their surroundings (Vardell, 1998). When given opportunities to explore a variety of genres some children may develop a preference for nonfiction which may very well be the spark that ignites their interest in literacy.

Duke (1999) noticed a low percentage of informational texts in some metropolitan area classrooms: in their libraries; on their walls and in other locations throughout the rooms. She observed that opportunities for writing informational texts took place only occasionally. This predicament is a cause for concern because it could be a “missed opportunity to use informational text to motivate more students’ interest in literacy in their present lives” (p. 25).

When given a choice several boys chose nonfiction over fiction (Scott, 2000). “The more opportunity the child had to read non-fiction, the more he wanted to read it” (p. 48): the boys who had the highest amount of non-fiction in their programs opted to read it more frequently than those who did not, suggesting that availability and variety might affect preference. Scott proposed that discovering what children like to read and teaching them how to read using those texts might have a positive impact on their attitudes about reading. Second grade boys selected informational books more frequently than storybooks (Houge, 2000). Houge discovered that illustrations, real information and the desire to learn made the books “more appealing” (p. 156) to the boys. Robinson’s (1997) results contradicted Houge’s findings. He stocked preschool and kindergarten classroom libraries with book sets containing an equal number of books in five genres. Analysis of book selections made by the children revealed that fantasy genres appeared to be their preference. “Content and familiarity were important factors for these children in making choices” (p. 298); they would frequently select favorite familiar storybooks.

Caswell and Duke (1998) worked with two struggling readers who preferred to read informational texts rather than stories and they planned their instruction accordingly.

Consequently, the boys became more active readers and writers; e.g., asking more questions or searching for information. Their literacy progress improved, suggesting that interest does facilitate progress, which is especially important for students who are struggling to become literate.

There are students who prefer to read and write nonfiction as the following researchers discovered. Some fourth grade students preferred to read nonfiction, especially when it was meaningful and they wanted to learn new things about a topic that was interesting to them (Perry, 2001). The majority of Garrick's (1992) first grade students indicated a preference for expository text because it tells about things that are real. The children mentioned specific topics such as science, history, math, and animals. Narrative texts did not constitute the majority of writing primary children composed in their journal writing (Kamberelis, 1999). Examination of their self-selected writing journals revealed a greater proportion of drawings, lists, personal letters, all-about texts, descriptions, and poems than was required in classroom assignments.

Summary

Several researchers question the advisability of a narrative emphasis in the primary years of school. Over emphasis of one genre deprives students of availability to and opportunities to read and write other genres that may be preferred. A wealth of opportunities with informational texts may influence literacy progress in a positive direction for some students.

Informational materials may be the only form of written text used by some preschool children. A narrative emphasis in the primary grades may cause a mismatch

between their home and school literacy experiences, resulting in delayed reading and writing progress. Opportunities should be available for all primary students to develop proficiency with the informational genres they will be increasingly expected to use throughout school and life.

Familiarity with a specific genre may affect students' reading and writing preferences and selections, which was the case with informational genres for some children. Many students, especially boys, preferred nonfiction because it presents real things they can learn about. Therefore, a balanced collection of texts, including sufficient numbers of nonfiction, reflecting students' interests should be available for children: nonfiction may be the means that turns a passive, unmotivated reader into an active literature seeking individual.

Summary of the Literature Review

Throughout the primary years in school children develop increasing control with reading and writing informational genres. Many beginning readers are able to transfer their knowledge of oral language structures when attempting to read (Clay, 1991; Pappas, 1991) and write texts (Chapman, 1994) in a variety of language structures. It appears that primary children do have an understanding of distinct written genres and realize that the structure of written text depends on the purpose for which it is written. They are able to replicate the language structures in pretend readings (Pappas, 1991), process informational structures when reading (Houge, 2000) and produce distinct genres when writing (Bissex, 1980; Chapman, 1994; Kamberelis, 1999; Zecker, 1996).

Children hear narrative forms of discourse most often in their early language experience. In conversation we typically relate “informational” events in a narrative format. However, children’s early writings are usually nonnarrative in nature (Newkirk, 1987; Sowers, 1985), emulating the functional forms they have seen in their preschool experiences. It appears that this preference rapidly changes, possibly due to an emphasis on narrative forms of discourse in the primary years of schooling (Langer, 1985; Newkirk, 1987; Pappas, 1991). Yet, “a narrow focus on narrative in early school years may interrupt the development of reading and writing in multiple genres” (Donovan & Smolkin, 2002, p. 428). This circumstance is especially critical for struggling, passive readers (Caswell & Duke, 1998); when a mismatch exists between home and school literacy texts (Caswell & Duke, 1998; Luke, 1991); and for children who may prefer to read informational books (Duke, 1999).

Genre knowledge may be developed as children progress through school.

Kamberelis (1999) advised that children should learn to use a variety of genres:

Thus, the more different kinds of genres that children learn as part of their language socialization and education, the deeper and broader their potential for cognitive and communicative growth is likely to be. Additionally, a broad comparative grounding in the forms and functions of multiple genres ought to help children better understand their various powers and constraints, thus allowing them to deploy genre knowledge more effectively and critically.

(pp. 165, 166)

Children will be better prepared for their later years in school and beyond if the development of competence and expertise with multiple genres begins in their primary years of education.

The review of the literature revealed several areas that researchers have explored regarding young children's competency with informational texts. Researchers examined children's early writing development (Bissex, 1980; Chapman, 1994; Kamberelis, 1999; Newkirk, 1987); responses to read alouds (Moss, 1997); pretend readings (Pappas, 1991, 1993); effects of instructional practices (Donovan & Smolkin, 2002; Kamberelis & Bovino, 1999); and interest (Caswell & Duke, 1998). It is expedient to discover how children read and comprehend nonfiction texts to effectively help them develop competence and expertise with informational genres. Are they able to learn new concepts in their early reading? How do they go about doing so? Our understanding of these processes may enable us to begin with children's early abilities while reading expository text and to build upon those abilities so that they may continue to be developed throughout the primary school years. If we can discover how children operate when reading expository text, then we may more effectively facilitate their developing literacy progress so they might read to learn while they are learning to read.

CHAPTER III

METHODOLOGY

The purpose of this study was to discover how early readers process information and comprehend the content presented in nonfiction texts. Two questions guided the study:

1. How do early readers process information while reading nonfiction texts?
2. What do children's responses reveal about comprehending nonfiction texts?

Chapter III describes the design and methods that were used to implement the research project. The details are organized by the following major categories: (a) the assumptions of a qualitative research design, (b) type of design, (c) a research timeline, (d) site selection considerations, (e) a description of the participants, (f) the role of observation, (g) data collection sources, (h) data collection procedures, (i) pilot study, (j) data analysis, and (k) credibility.

Assumptions of a Qualitative Research Design

A qualitative research design was used to discover how early readers process information and comprehend the content presented in nonfiction texts. Qualitative research is exploratory research (Creswell, 1994) designed to promote understanding of a process or experience through inductive forms of inquiry (Merriam, 1998). Existing took place with students individually, on their school building. The sessions occurred in the

theories are not tested and hypotheses are not established a priori; attempts to generate theory are accomplished through the process of induction (Merriam, 1998). Qualitative research is an interpretative, nonmathematical process “carried out for the purpose of discovering concepts and relationships in raw data and then organizing them into a theoretical explanatory scheme” (Strauss & Corbin, 1998, pp. 10,11). Qualitative research takes place in a natural setting (Creswell, 1994; Merriam, 1998) where “the researcher is the primary instrument for data collection and analysis” (Merriam, 1998, p. 7) allowing for interaction with those in the study (Creswell, 1994).

This study fits the criteria designated by the qualitative paradigm. A review of the literature indicated that research exploring the behavior and responses of young children as readers of nonfiction texts is lacking. Discovering how early readers actually read and comprehend nonfiction texts adds to the current body of knowledge regarding young children’s ability to use informational materials when reading and writing. Analysis of oral reading behaviors and audio and video recordings, along with a comparison of specific topic knowledge before and after reading, revealed relationships and patterns on an individual basis and across the sample. These relationships and patterns were used to describe how children processed information while reading nonfiction texts and how they comprehended the content presented in those texts.

The research was conducted with as little disruption to the students’ natural setting as possible (Merriam, 1998). However, some adjustments were made in order to effectively collect the data. Reading response sessions developed by the researcher took place with students individually, in their school building. The sessions occurred in the

small classroom where I teach. Students work with adults individually in school or classroom settings to varying degrees. Therefore, meeting with students individually was a natural occurrence and was not considered out of the ordinary.

The purpose of the study was to discover how children process information to comprehend the content presented in nonfiction books. Comprehending is a process that may change after a text is read (Goodman, 1994) and conversation with others may change a child's comprehension of a text (Ruddell & Unrau, 1994). Consequently, a child's response in a group situation may be influenced by what another student said, which is beyond the scope of this study. Realizing that my responses might influence a child's comprehension as well, procedures were devised to monitor my conversation for minimal influence in that regard. The procedures are itemized in the section Reading Response Session Format presented later in this chapter. We met outside of the child's classroom because my presence and the video equipment might have distracted other students in the room. There was less chance for interruptions and less background noise in a quiet location other than the classroom.

I was the primary instrument for data collection, meeting with each student for one session to determine their text reading level and three subsequent reading response sessions. Analysis of written audio and video recordings of the three sessions enabled me to understand how the children processed information and comprehended the content presented in the nonfiction books. I was responsible for the majority of the data analysis; an interrater was used to establish the categorization and coding credibility of reading behaviors and conversational responses.

The Type of Design

A grounded theory design using the constant comparative method of analysis was used to discover how early readers process information and comprehend the content in nonfiction texts. A grounded theory evolves and develops from the data (Merriam, 1998; Strauss & Corbin, 1998). The researcher does not begin with preconceived assumptions or hypotheses but “begins with an area of study and allows the theory to emerge from the data” (Strauss & Corbin, 1998, p. 12). When using the constant comparative method the researcher looks for similarities and differences in the data (Merriam, 1998) throughout the data collection process. Data are categorized by similarities in an attempt to discover patterns on which the theory is built (Merriam, 1998). “Grounded theories, because they are drawn from data, are likely to offer insight, enhance understanding, and provide a meaningful guide to action” (Strauss & Corbin, 1998, p. 12). A grounded theory describing how children process information and comprehend the content presented in nonfiction texts evolved from patterns represented by the data.

Researchers have to start somewhere; research projects are shaped more or less by a theoretical framework, especially during the beginning stages. This situation has led to some criticism of grounded theory for “its failure to acknowledge implicit theories which guide work at an early stage” (Silverman, 2001, p. 71). I acknowledge that theories about literacy processes guided my work, especially those theories which I have drawn upon to form my philosophy of reading (see Researcher’s Role). I believe that reading is a meaning driven process; evidence of meaning construction reflects how well a text was read. I assume that children use sources of information (Clay, 1991), or knowledge

sources, meaning being one of them, to understand what they are reading (Rumelhart, 1994). The analysis of children's reading behaviors, together with sources of information used or neglected in errors, to solve unknown words, and make self-corrections, was the basis for discovering how the children processed information when reading nonfiction texts. I tried not to have preconceived notions about what those sources of information might have been or how the children might have used that information to help them comprehend what they were reading. The data were analyzed by looking for evidence: seeking patterns to discover what children do while reading nonfiction texts. These patterns of evidence were used to develop a grounded theory describing how emergent readers process information and comprehend the content of the nonfiction books they read. The development of this "substantive" theory was rooted in "everyday-world situations" (Merriam, 1998, p. 17) and offers insights into instructional practices.

Research Timeline

A timeline was drafted before beginning the study. The timeline provided an organizational framework for completing each of the four phases. Table 2 represents the scheduled tasks.

Table 2

Research Timeline

Phase 1 January – December 2003	Phase 2 August - December 2003	Phase 3 January – April 2004	Phase 4 May – June 2004
Continue to read literature – refine Chapter 2; Chapters 1, 3	Continue to read literature – refine Chapter 2; Chapters 1, 3	Final analysis of data – compare across cases	Complete Chapter 5
Complete and defend proposal	Confer with teachers about student selection	Complete Chapter 4	Final draft
Negotiate entry: Secure district consent; talk with administrators, principals, classroom teachers	Consent form to parents; finalize student selection		
Determine teachers whose students will be participating	Become acquainted with children		
Secure human subjects consent	Determine text reading level		
Develop a schedule for reading sessions	Hold reading response sessions with students		
Define/refine analysis procedures	Begin coding and analyzing data as it is collected		
Prepare data base; spreadsheets, etc.			

Site Selection and Entry

Considerations for selecting a site and a description of the setting are presented in the following sections.

Site Selection

Methods to gain entry were followed for selecting a site that “maximizes the opportunity to engage [the] problem” (Erlandson, Harris, Skipper, & Allen, 1993). Guidelines were used to determine the site where the research took place.

1. *Ability to gain entry.* This study was conducted in the school district and building where I was employed, facilitating the ability to gain access. Approval from district administrators and the Institutional Review Board was obtained (see Appendix A).

2. *The “processes, people, programs, interactions and/or structures” (Erlandson et al., 1993, p. 53, cite Marshall and Rossmann, (1989) included in the research question are likely to be situated in the site.* The research took place in an elementary school where early readers were enrolled and students were learners in a balanced literacy program.

3. *Allow for the proper amount of time.* Once students were selected the data collection took approximately one week. Unforeseen complications that extended the time frame arose. One of the first students to be selected became ill; another was selected 3 days after the data collection with the other students began. Being an employee of the school district where the study took place allowed for flexibility in that regard.

4. Data quality and credibility are “reasonably” assured by the ability to make appropriate sampling decisions. The availability of primary classrooms in the building enabled me to select early readers developing conventional literacy behaviors close to the average in their classrooms.

I conferred with the classroom teachers to schedule sessions so that minimal time from classroom instruction was lost. Administrators were assured that my role as researcher would not interfere with my job related responsibilities.

Setting

This study took place in a suburban public school district located in the south central United States. At the time of this writing the district served approximately 13,600 students in 11 elementary schools, 4 middle schools and 2 high schools.

Participants

Participants in this study included the researcher and five kindergarten students. The students, whose teachers assisted with the selection process, were chosen from two kindergarten classrooms. The following sections describe the researcher’s role and methods for selecting the teachers and their students who participated in the study.

The Researcher’s Role

Reality is subjective. The qualitative research paradigm assumes that “the constructed realities of no two human beings are identical” (Erlandson et al., 1993, p. 21). My worldview is similar: I believe that a particular situation or circumstance will be perceived differently by each individual involved; there will be as many different perceptions and ensuing interpretations about an event as there are people involved.

For example, teachers have different perspectives or views about children's self-correction attempts when reading. One teacher may view self-correction as a positive behavior indicating a "developing control" of written language (Clay, 1991) and applaud the fact that a child noticed a discrepancy between what was said and what was on the page. Another teacher, concerned about accuracy, may view this behavior as negative.

A qualitative researcher is the principal agent of collection, and "all observations and analyses are filtered through that human being's worldview, values and perspective" (Merriam, 1998, p. 22). The following section briefly describes my theory of reading and how I developed an interest in this topic to inform the reader about my perspective, which influenced my observations and the subsequent interpretations reflected in my writing.

My Theory of Beginning Reading

Reading is a meaning driven activity – the main purpose is to understand or comprehend the printed message (Clay, 1991; Rumelhart, 1994). Semantic, syntactic, phonological, and orthographic knowledge all contribute to the reader's ability to interact with the text (Clay, 1991; Goodman, 1994; Rumelhart, 1994). Comprehending is a constructive process that occurs both during and after reading; it is dependent on what the reader previously knows before reading (Goodman, 1994). Making links to what is known through life experiences; knowledge of different textual structures; familiarity with format and organizational features, facilitates comprehending during reading (Clay, 1991; Goodman, 1994). Comprehending occurs during reading and may change afterwards (Goodman, 1994) as meaning may be reconstructed (Ruddell & Unrau, 1994).

Interest in the Topic

My interest in researching how young children read and comprehend nonfiction texts began several years ago during tutoring sessions with children struggling to become literate. I noticed that some of my students read nonfiction texts more easily than the narrative books that I more frequently chose. Since that time, several classroom teachers have related that some of their students prefer nonfiction and choose them for independent reading on a regular basis – especially the boys. Consequently, I have come to question the assumption that narrative texts should be the primary genre for teaching young children how to read and believe that a variety of literary genres should be included in primary classrooms.

“Personal capabilities and professional experience should be taken into consideration when determining a research problem” (Erlandson et al., 1993, p. 47). I am comfortable working with young children and through my experience as an educator have developed the skills necessary to establish rapport and build trust with students. I am able to make the children feel at ease while reading and engage in conversation when expedient.

Teaching first grade students in one-on-one tutoring sessions and teaching primary age literacy and remedial reading groups has extended my awareness, knowledge and understanding about how children learn to read, enabling me to select and introduce texts in a manner that reflects children’s age, interests, and abilities. On a daily basis I have recorded, scored, and analyzed running records to discover how children might be using sources of information to support reading and comprehend text. I took detailed

notes of children's reading and writing behaviors. Reflection and analyses of those notes were carried out to determine the students' capabilities as readers and writers. Expertise with these daily practices facilitated recording and analyzing notes taken during conversations and text readings.

Teacher Selection

I was a new employee in the district at the time the research took place and did not know many of the teachers. Researchers should begin by seeking an informant, who understands the nature of the research and the culture, to refer potential participants (Erlandson et al., 1993). An insider who understood district and school policies and who knew many of the primary teachers assisted in the initial phase of teacher selection. She was asked to recommend kindergarten teachers who provide ample time for the students to read books. A balanced literacy program provides opportunities for children to engage in reading and writing tasks with varying degrees of teacher support. Components of the reading framework include teacher reading aloud, shared reading, guided reading, and independent reading (Fountas & Pinnell, 1996). My informant recommended two of the five teachers in the building that best fit the criteria. The children in these kindergarten classrooms had numerous opportunities to read books both independently and with teacher support.

Communication with the teachers, both in person and in writing (see Appendix B), explained the nature of the research and sought consent for some of their students to participate in the study. They were assured that refusal to participate would not affect our

working relationship. The teachers consented enthusiastically, “They might learn something new.” Their students were asked to participate in the study.

Student Selection

Qualitative research samples are usually – “nonrandom, purposeful and small” (Merriam, 1998, p. 8), governed by what is relevant according to the designated problem of the study (Erlandson et al., 1993). Participants are selected because their particular traits and characteristics correspond to what the researcher is seeking to discover (Erlandson et al., 1993) and will thereby “maximize the researcher’s ability to identify emerging themes” (Erlandson et al., 1993, p. 82). To obtain a sample of five children, two kindergarten teachers were asked to have their students participate in the study.

The purposive sample consisted of kindergarten children who were designated as early readers. The children were still developing conventional literacy behaviors and concepts (Teale, 1995, p. 71) as they were beginning to construct a system for reading and producing written language. These early readers were progressing on a path towards literacy within or above the average range in their classrooms.

Successful beginning readers generally use the information or knowledge sources in an integrated way for problem solving, whereas low progress readers are “more likely to switch from one information source to another” (Clay, 2001, p. 67). Struggling readers may have “idiosyncratic needs” (Clay, 1993b) that might require more support before and/or during the text reading, therefore session procedures might have to be altered considerably. Detailed analyses of what competent early readers do to problem solve “[provides] a model of what has to be done to read and write well” (Clay, 2001, p. 43).

Analyzing behaviors of competent early readers reading nonfiction texts, indicated what knowledge sources were used to process information and comprehend novel content presented in the books for individual children, as well as across the sample.

Children receiving English as a Second Language instruction were designated as such and not included in the study. A child may not be able to produce spoken language effectively in a new or different situation (Krashen, 1982; Krashen & Terrell, 1983). Students in the acquisition phase of learning English may find reading books with an unknown adult, with unfamiliar content in a second language stressful, thus raising their anxiety level and causing unnecessary discomfort.

Selection of Early Readers

The kindergarten teachers, who participated, implemented *guided reading* practices in their classrooms and were familiar with the characteristics of beginning readers. They were asked to consider the characteristics of early readers described by Fountas and Pinnell (1996). Characteristics include: (a) relying more on the text and less on the illustrations for support; (b) fluency with several high frequency words; (c) control of beginning literacy behaviors such as directionality and word-to-word match; (d) developing a network of strategies such as monitoring (checking), searching (looking), cross-checking (comparing one source of information with another) and self-correcting to facilitate effective reading; (e) developing the ability to use reading strategies with more than one source of information; and (f) are able to read “appropriately selected texts independently” (p. 177) following an introduction by the

teacher. A written description of those characteristics was given to each teacher for reference.

Students who displayed the characteristics of early readers were considered for the study. One teacher (A) identified eight students as early readers; the other teacher (B) identified six. Consent forms addressed to the parents were sent home in the students' nightly folders (see Appendix A). Final selection was determined by the order the consent forms were returned: the first five returned determined the children who participated in the study.

Final Selection

Fourteen consent forms were sent home with the children in their nightly folders. I kept a written record of the students who received the parental consent forms, noting the date they were returned to me. Nine of the 14 children returned the forms. The first five returned determined the children who were selected to participate in the study. One child was absent on the first day of data collection; he remained ill for several days. The next child who returned the consent form was selected in his place. The students who participated in the study are entered in Table 3.

Table 3

Final Student Selection

Student	Gender	Classroom
Carley	Female	B
Christopher	Male	B
Erica	Female	A
Joseph	Male	B
Sara	Female	A

Data Collection Facilitated through Observation

Observation is “fundamental to understanding another culture” (Silverman, 2001, p. 12), provides “firsthand experience” with the participants (Creswell, 1994), and allows the researcher to discover relevant relationships (Erlandson et al., 1993) about a particular instance or situation. Written and taped observations of children’s behavior during reading represented what they did when reading; the records were analyzed to gain an understanding of how children process information while reading. Written and taped recordings of children’s responses before, during, and after reading were analyzed to provide insights that enabled me to make sound and appropriate hypotheses (Erlandson et al., 1993) about how the children comprehended the content presented in nonfiction texts.

Observation is a useful tool of assessment for children up to 8 years old, when children are engaged in a complex activity or introduced to new areas of learning (Clay,

2002). The use of observation in this study included all of the criteria mentioned by Marie Clay:

1. Kindergarten children are usually 5-6 years old.
2. Nonfiction text format or concepts presented in the texts may be unusual.
3. The process of learning about print and learning from print can be rather complex indeed.

Early readers display a wide range of abilities. “Children move into reading by different tracks” (Clay, 2002, p. 10) and they enter kindergarten with a variety of literacy strengths. Children may be more able to demonstrate their understandings rather than describe or explain them (Harker & Green, 1985). Therefore careful observation recorded in notes and on audio and videotapes was sensitive enough to measure the wide range of abilities, understandings, processes, and strategies displayed by the early readers as they read the nonfiction books. Observation provides a means to distinguish between the varying degrees of literacy demonstrated by students.

Data Collection Sources

The following sections describe the data collection sources that were facilitated through observation. They include: written documents, running records fieldnotes, interviews, and audio and video recordings.

Written Documents

Written documents were examined to understand how the students engaged in “concrete activities” (Silverman, 2001). Running Records noting children’s oral reading behaviors were analyzed to discover what sources of information children used while

reading nonfiction texts. Fieldnotes recorded during interview conversations before and after reading, were analyzed to discover what children may have comprehended during reading. Notes regarding other behaviors, such as smiling, rubbing eyes, etc. were also recorded as well.

Running Records of Text Reading Behavior

Running records (see Appendices C and E) are taken with the teacher sitting along side of a child who is reading a text. They take place in a natural setting where the child is involved in a meaningful, purposeful task - engaged in the act of reading. Authentic or "real-life" assessment tasks administered in the context in which the child is learning can produce the most meaningful information (Horowitz, 1995; IRA/NCTE & Assessment, 1994)². "The further away one gets, the more abstract the data become, the less relevant they seem, and the more difficult it becomes to use such data to improve teaching and learning" (IRA/NCTE & Assessment, 1994, p. 16). As I took running records, students were reading to me, carrying out a "real-life" task in their school building in a context similar to classroom activity: reading to their teacher as she records their oral reading.

"The prime purpose of a Running Record is to understand more about how children are using what they know to get to the messages of the text, or in other words what reading processes they are using" (Clay, 2002, p. 54). An analysis of errors and

² The citation about authentic assessment was based on an interview Rosalind Horowitz had with Ralph W. Tyler. Tyler was recognized as a "pioneer in the field of education and assessment" (p.68). During the interview he related insights and caveats concerning assessment and evaluation in education.

self-corrections provided insights as to how the children used what was known to construct meaning while reading.

Clay (2002) advises teachers to record all of a child's behavior during reading, to obtain a more detailed and comprehensive representation of what the child might have been doing, resulting in a more precise interpretation of those behaviors. Responses made by a child while reading provided "evidence of the construction of meaning" (Askew, 1991, p. 232). Observable behaviors such as additional comments and looking at the illustrations were recorded, in addition to the oral reading.

Audio and video recordings were reviewed and compared to the written recordings of oral reading for corroboration. The data collected from these sources were analyzed to gain an understanding of how the children used their knowledge to comprehend the content presented in the nonfiction books.

Fieldnotes

The findings reported in this study were seen through the lenses that I wear. Frank (1999) described a notetaking and notemaking process ethnographers use to record fieldnotes. Notetaking, or describing, is used to maintain objectivity; the researcher describes the physical surroundings and events being observed, withholding personal interpretations. Notetaking allows the researcher to "speak from evidence" (p. 57). The notemaking portion of the fieldnotes is used to interpret, evaluate, and question observations. Objectivity was maintained by recording what behaviors the child exhibited. Subsequent reflection and analysis of those notes and audio and video recordings were used to make interpretations, looking for patterns that led to probable

explanations about how children processed information and comprehended the content in the nonfiction books. I have had extensive experience recording and analyzing observations of children's behavior in a manner similar to the notetaking/notemaking process outlined in the preceding description.

Handwritten notes supplemented verbal responses with "contextual details" (Emerson, Fretz, & Shaw, 1995). Notes about physical surroundings and activities and nonverbal forms of communication, such as bodily gestures and facial expressions, added another dimension to taped interview conversations. Handwritten notes are also precautionary, in case the recording equipment malfunctions (Creswell, 1994). Videotapes were used to back-up the notes. I reviewed the tapes to critique my interviewing strategies, in order to become a more effective interviewer.

Interview Conversations

An open-ended interview that is similar to informal conversation (Erlandson et al., 1993) was used both before and after children read a nonfiction book. Conversations with children gave an indication of how they responded to and comprehended text; "Much can be learned by becoming an active, informed observer of communications" (Harker & Green, 1985, p. 226). Conversation with students before reading helped me to discover what they knew about the topic presented in a particular book. Conversation after reading was compared to the before reading responses to determine how comprehending may have shifted as a result of reading the book. Analyzing the dialogue provided an avenue for discovering factors that influenced and facilitated comprehending.

Effective interviews transpire through the development of a “well-organized plan, built around the central questions and issues that the interviewer wishes to explore” (Erlandson et al., 1993, p. 90). I referred to a set of questions and comments, carefully designed to elicit comments from the children, with minimal input from me, to discover what they knew about a book’s topic both before and after reading. A detailed account of the procedures is included in Phase III - Reading Response Sessions.

Audio and Video Transcripts

Transcripts of audio and video recordings provide information about situations as they occur naturally (Silverman, 2001). Audio and video recordings taken during sessions with the students allowed for a thorough examination of the patterns of interaction (Emerson et al., 1995) between children and myself during conversations and between the children and the text while reading.

Use of recordings and written records established triangulation to determine if “the information gathered [was] generally supported or disconfirmed; meaning is enhanced through multiple sources, providing the means for thick description of relevant information” (Erlandson et al., 1993, p. 115). Videotapes provided the additional dimension of physical, nonverbal gestures, such as yawning, smiling, or nodding the head that were not observed or detected on written or audio records. Information from all the sources provided triangulation to validate the authenticity of findings (Silverman, 2001) and establish credibility (Erlandson et al., 1993).

Data Collection Procedures

Meetings with the children were held in three phases. Each phase had a specific purpose. The phases are specified in Table 4. Phase I, II and III are described in the following sections.

Table 4

Data Collection Phases

Phase I - Entry	Phase II – Text Reading Level	Phase III – Reading Response Sessions
Meet with children to explain purpose and establish rapport.	Establish children's reading performance. Select text reading level at 90% or above.	Children read and respond to nonfiction texts in three, half-hour sessions.

Phase I – Entry

After the students were selected and parental permission obtained, I met with each child individually. The purpose for the upcoming sessions was related to the children in a brief and simple explanation. The remainder of the time was devoted to getting to know each other, sharing our interests and hobbies. The purpose of this short meeting was to establish rapport and trust, so the students would feel comfortable and at ease with me.

The following section describes the method for establishing the children's text reading level. A summarization of their text reading behaviors follows.

Reading Level Established

Booklets from a leveled collection of narrative books (published by Scott Foresman) were used to determine each child's reading level. The gradients of difficulty of the texts have been established within the Reading Recovery field-testing procedures (Askew, Fountas, Lyons, Pinnell, & Schmitt, 1998) and research studies conducted by outsiders of Reading Recovery (Hoffman, Roxer, Salas, Patterson, & Pennington, 2001). The booklets are arranged in an "escalating gradient of difficulty" (Askew et al., 1998, p. 19) and comprise an established basal system that has "been shown to be a stable measure of reading performance" (Askew et al., 1998, p. 10).

The terms easy, instructional, and hard are used to "describe how a particular child read the text" (Clay, 1993a, p. 55). A child's reading performance with the narrative books was used as a guide for selecting the nonfiction books. For the purpose of this study, the highest narrative level read by a child at an easy (95%-100% accuracy) or instructional (90%-94% accuracy) was used as a guide to determine that child's nonfiction level for the reading response sessions. A hard text (80%-89% accuracy) may present too many challenges causing the reading process to fall apart. Informational texts place different demands on children than the narrative texts they may be more accustomed to reading. Consequently, cognitive capacity may be limited due to the additional "dimensions of difficulty" (Spiro et al., 1980, p. 23) presented in nonfiction

texts. Reading behaviors on corresponding levels of instructional and easy text provided insights about how children process information when reading nonfiction.

Summarization of the Children's Reading Behaviors

Table 5

Text Levels and Accuracy

Student	Text Level	Accuracy	Self-Correction Ratio
Christopher	3	100%	1:1
Joseph	5	95%	None
Sara	5	95%	1:3.5
Carley	6	90%	1:6
Erica	6	92%	None

Table 5 depicts the highest level narrative booklet, read by each child at or above 90% accuracy. Carley and Erica both read level 6, Joseph and Sara level 5, and Christopher level 3. The running records were scored and analyzed following the text reading level sessions. A brief description of their behaviors was recorded on the running record form and is related in the following paragraphs.

Christopher controlled directional behavior and one-to-one match. He used his finger and read in three to four word phrases with expression. He self-corrected when the initial letter did not match. Christopher read a text level 3 at 100% accuracy. One out of one error was self-corrected.

Joseph usually read in two and three word phrases using his eyes, controlling directional behaviors and one-to-one match. He looked at the picture and articulated the first sound of unknown words. Errors resulted when he omitted a word or was told the word by me.

Sara controlled directional behavior and one-to-one match. She usually read with her eyes, occasionally pointing with her finger. Reading was word-by-word with some two to three word phrasing. Errors indicate that she used meaning, structure, and visual information. She self-corrected additions. Sara read text level 5 at 95% accuracy. She self-corrected 1 out of every 3.5 errors.

Carley followed directional conventions and one-to-one match. She used her finger while reading in two and three word phrases. Carley looked at the picture to solve words. Errors indicate that she used the information sources, meaning, structure, and visual information. She attended to initial letters in words. The highest level read was level 6 at 90% accuracy. She self-corrected one out of six errors on that text.

Erica followed directional conventions and used her finger for one-to-one match. She read in two to three word phrases, with some word-by-word reading. Erica attempted to solve unknown words by articulating initial letters and clusters; sometimes going across the entire word. Analysis of errors indicates that she used meaning, structure and visual information at the beginning of words. She self-corrected errors when she neglected to use initial letters by rereading to the beginning of the line. Erica read level 6 at 92% accuracy. She did not correct any of her four errors on that particular text.

Detailed procedures for taking, scoring and analyzing running records are found in the Data Analysis section under the subheadings, Taking Running Records; Scoring Running Records and Analyzing Running Records.

Phase III – Reading Response Sessions

Beginning on the day following the text reading level session, I met with each student for three consecutive days in sessions lasting approximately 20 minutes in length. The format for the sessions is detailed below in the section Session Format.

Nonfiction Text Selection

Texts classified by the Reading Recovery leveling system were used in this study. The books are leveled according to a gradient of difficulty beginning with the simplest books designed for emergent readers to more complex texts for early readers and early fluent readers. The differences between each subsequent level of text are minimal. These books have been leveled using extensive field-testing procedures to include high quality books (N. Anderson, 2003). Book levels 3-12 include textual elements, such as sentence structure, vocabulary, and format that are considered suitable for early readers. Nonfiction books corresponding to the narrative levels were selected for the children to read during the reading response sessions.

Guided reading groups are comprised of a small number of children who have similar reading development and are able to read text of about the same difficulty. The objective of guided reading is to help children develop strategies to read independently (Fountas & Pinnell, 1996). The books selected for use in the reading response sessions

were little books that teachers might use during guided reading lessons. Appendix D lists the little books the children read in the nonfiction reading response sessions.

The children read books leveled three, five, and six according to the Reading Recovery leveling system. General characteristics of the nonfiction books read by the children in this study are outlined below.

1. Most of the topics are familiar, yet some may be more abstract or less well known to young children. Familiar topics include going to bed, playing, and farms. Children may not be as familiar with specific characteristics of bats or owls; they may not be familiar with skiing.
2. Most of the language structures in the books were similar to natural language, yet some were not as natural sounding. *Snails lay eggs* is a structure children might be familiar with. *Snails do not look after their eggs* sounds less natural.
3. Language patterns were repeated in most of the books: *An owl has...*, *We put on our...* Sometimes patterns changed. In We Ski (Grestone, 1997) the phrase *We put on our ...* was used to relate skiing apparel. The last two pages of text read, *We go up, up, up. We ski down, down, down.*
4. The books contained many easy high frequency words: *can, I, we, my, a, in.*
5. Punctuation consisted mainly of periods to end sentences.
6. Print layout and format were consistent within each particular book. Most pages contained one or two lines of text.

7. Font was easy to read with adequate spacing between words.

8. Pictures were supportive, but did not “tell all.”

9. The books were 8 or 16 pages in length.

Choosing Quality Nonfiction

Specific features should be considered when selecting nonfiction books for classroom use because the “nature of inquiry may be affected by the quality of nonfiction books” (Bamford & Kristo, 2000). I consulted the following criteria for suggesting nonfiction books outlined by Bamford and Kristo (2000).

1. Accuracy – Authors and publishers have a responsibility to make sure that the information presented in their books is accurate.

2. Content and organization – How the book is organized to relate information or content in a logical manner.

3. Style and voice – An author’s style and voice set the tone of the book.

4. Access – Features that facilitate accessibility of the information include table of contents, inserts, indexes, and glossaries.

5. Visual information – Text is supported and enhanced by visual features such as illustrations, photos, timelines, diagrams, and captions.

When selecting nonfiction texts for instructional use with young children it is essential to consider their reading proficiency. What elements of the task do they control? What support will the book provide? What might the challenges be? Considerations include (Moore, 1998):

1. Directionality and word-by-word matching – Ability to control directionality and word-by-word matching.
2. Structure – Complexity of language structure ranges from simple, predictable structures to complex.
3. Vocabulary – Nonfiction books contain varying amounts of familiar and technical terms.
4. Book length and challenges – Number of words and gradient of difficulty.
5. Illustrations – Illustrations may be highly supportive or less explicit.
6. Page layout and format – Books may have a consistent starting point or one that varies from page to page.
7. Access features – Nonfiction books for young children may have no access features or a few.

The books selected for the reading response sessions contained features of quality nonfiction suitable for children; the characteristics displayed by early readers were considered. They were leveled using the established Reading Recovery leveling system.

The following example describes features I considered when selecting What Lays Eggs? (Gracestone, 1998).

1. Accuracy – The book was published in 1998. Animals that lay eggs have not changed since that time.
2. Content and organization – The author begins with a general statement about animals that lay eggs. The content becomes more specific as specific animals are identified. Many of the animals would probably be familiar to young readers.
3. Style and voice – Language structures vary. The repetitive phrases include simple and more complex structures: *Snakes lay eggs; Most snakes look after their eggs.* The small number of words and gradient of difficulty (level 6) indicate that the book was written for early readers.
4. Access features – An index is included on the last page. A few access features are appropriate for young readers.
5. Visual information – The print consistently starts on the upper left on the left hand page; it begins on the bottom left on the right hand page. The font size is larger on the left page than the right; spacing is adequate. Layout and format may vary as early readers become more proficient. The full color photographs are vivid and somewhat supportive of the text. Diagrams of hatching cycles add interest while being informative.

Reading Response Session Format

A specific set of procedures were followed in the reading response sessions. They are listed in Table 6; a complete description follows.

Table 6

Session Sequence

Step	Procedure
1	Establish atmosphere through casual conversation
2	Explain the reason for having the sessions
3	Book introduction designed to discover children's knowledge of the topic
4	Child previews the book
5	Child reads the book
6	Reader response conversation designed to reveal what was comprehended during reading

The procedures for each reading response session were implemented in the same manner; introductions were adapted to the particular contents in each book. The following is an example of the format that I developed for the book What Lays Eggs? (Gracestone, 1998) read by Erica and Carley.

What Lays Eggs? – Level 6

1. Establish atmosphere. Engage in casual conversation.

2. Reason for reading response sessions.

Talking and reading with you will help me to figure out some good ways to help children learn to read new books.

I'll be writing things down and taping our time together to help me remember what we did.

3. Introduce the book.

This book is called What Lays Eggs? It is an information book. Information books tell us about things. Before I read an information book, I think of some things I know about the topic. That helps me to read and learn new things.

I know that many animals lay eggs. Mosquitoes and butterflies are some animals I know that lay eggs. What are some animals you know that lay eggs?

Repeat the question two more times.

4. Preview the book.

Take a look through the book before you read.

Do not directly answer questions about specific concepts. If I do, note it. Possible responses to questions:

You might find out when you read

I wonder why

What do you think?

5. Text reading.

Do not directly answer questions. If I do, note it. Responses to questions:

I wonder why

Keep reading maybe you'll find out

What do you think?

6. Reader Response Conversation.

Request the following in the order designated. 1,2- required. 3,4-optional.

- *Tell me what you think about ... What Lays Eggs?*
- *Tell me what was new to you.*
Was anything else new to you? Repeat one time.
- *Tell me what was interesting to you.*
Was anything else interesting to you? Repeat one time.
- *Find a part that you liked. Why?*
Was there any other part you liked? Repeat one time.

The following question may provide additional insight about comprehension, such as the ability to make inferences:

Is there anything else you'd like to know about animals laying eggs?

7. Other procedural considerations.

Review the procedures before the interview conversations. Rehearse my statements and questions so I'm not reading the text. My language should sound natural; therefore comments suggested in the procedures do not have to be duplicated exactly.

Limit my conversation.

"Isn't that interesting" to affirm what they are saying

"Tell me more" to request additional information

If the transcription reveals that I have engaged in conversation that may affect comprehending, do not analyze subsequent data.

If a child asks a question, I will respond with:

"What do you think?"

If the child persists, answer the question and do not analyze subsequent data.

Reader Response Conversations

The purpose of an interview is to find out what an individual understands about the issues being explored (Erlandson et al., 1993). The procedures, questions, and comments outlined above were developed to help me monitor my conversation in order to discover what a child knew about a particular book's content both before and after reading. Structured interviews do not always work well with young children, especially when asked a series of questions (Johnston, 1992). In order to keep the atmosphere and conversation as natural and relaxed as possible the following general interview procedures (Johnston, 1992) were utilized.

1. Sit next to the child, rather than across from. It is less confrontational.
2. Use the same size chair to minimize the power differential.
3. Be cognizant of my responses – “good” “right” or “okay” can be interpreted as evaluative suggesting that there are right and wrong answers.
4. Allow the student to do most of the talking.
5. Use the child’s terminology when speaking or rephrasing.
6. Avoid asking, “What do you mean?” This question conveys that we want to hear it in “our” language and that we think the child is not good at expressing himself.
7. Have an object of mutual interest: the book.
8. The book reading is a shared experience between the child and me. I’ll avoid statements such as “tell me about the book” (Johnston, 1992) which might be interpreted as “this is a test” (Johnston, 1992).
9. Practice what I can before the sessions so my conversation sounds natural.

10. If child doesn't understand what I'm saying or asking, rephrase my comments.
11. Allow a wait time of 10 seconds for the child to respond.

Data Management and Organization

Computers facilitate the creation, storage, and management of data in the research process (Coffey & Atkinson, 1996). *Word for Windows®* was used for textual tasks such as writing and editing notes and memos, transcribing conversations and tape recordings, preparing files for coding and writing drafts of the final report (Coffey & Atkinson, 1996). Data collected from the reading response sessions were compiled and organized in *Excel®* spreadsheets allowing for flexible sorting and categorizing options.

Research/Reflexive Notebook

I kept an electronic research notebook in a *Word®* document, recording thoughts about the session procedures, analysis and categorization and coding of data. I noted what went well and what did not. Ideas for answering future research questions using the data were noted. Reflections following communication with Dr. Anderson (Dissertation Committee Chair), meetings with the Dissertation Committee, teachers, school district personnel, and parents were added to the notebook. Personal thoughts and reflections about the process were recorded as well.

Pilot Study

A pilot study, with two kindergarten children, was conducted to establish session procedures and format, including book introductions and interview protocol. Various methods of organizing and categorizing data were tried. Consequently, some of the methods were revised through consultation with Dr. Anderson.

During the pilot study, I began using the tape recorder on the third meeting day for our first nonfiction reading response session. One of the children was preoccupied with the recorder. I began using the recording equipment during our initial “get acquainted” meeting with the five kindergarten children who participated in the study. By our third meeting they were accustomed to the equipment.

I critiqued the interview sessions to improve my effectiveness as an interviewer. Transcripts from the conversations revealed that I did too much talking and my conversation sounded stiff and stilted at times. Ample wait time for responding was allotted and the children seemed relaxed and at ease.

Many of my comments following the text reading could have influenced what the children said and comprehended. Questions and comments used in the study were designed for minimal influence from me in that regard.

Data from the pilot study were used to establish preliminary methods of organizing, analyzing, and categorizing the data. As data from the study were collected organizational procedures were revised, analysis became more in-depth; new categories and codes emerged and old ones were replaced or revised.

Data Analysis

Analysis was ongoing and occurred alongside of data collection (Erlandson et al., 1993). Running records were scored and analyzed immediately following the reading response sessions. I began entering data in *Word®* documents and onto *Excel®* spreadsheets as the data were being collected. Audio and videotapes were used to confirm, revise, and enhance written documentation to obtain a clear representation of the

children's oral reading and interview responses. Table 7 provides an overview of the data collection process and analyses.

Table 7

Data Collection Procedures and Analyses

Procedures	Sources Facilitated through Observation	Analysis I	Analysis II	Grounded Theory
Text Reading Behavior	Running records of oral reading behavior	Score; analyze; code and categorize responses	Look for overall patterns detecting similarities and differences for individual children and across the sample	How early readers process information while reading nonfiction texts.
	Audio tapes	Transcribe to verify and extend written documentation; code and categorize		
	Video tapes	Corroborate with written and audio recordings		
Reading Response Interviews	Fieldnotes	Verify language units with audio tapes; code and categorize responses	Look for overall patterns detecting similarities and differences for individual children and across the sample	What children's responses reveal about comprehending nonfiction texts.
	Audio tapes	Transcribe fieldnotes into language units; code and categorize		
	Video tapes	Corroborate with written and audio recordings		

The following discussion focuses on the oral reading behaviors and interview responses conveyed by Erica during her reading response session, focusing on the book What Lays Eggs? (Gracestone, 1998). Transcriptions were reorganized into spreadsheets and sorted in various ways that enabled me to detect patterns of responding for each child and across the sample. Erica's reading response session is documented in Appendix E.

Data analysis established that none of the five children exhibited the behaviors or responses characterized in all of the categories in any one of the three reading response sessions. Therefore, examples from Christopher and Carley are included as well. Examples from these three children's sessions are used to describe the steps I took to categorize and code the data to derive a grounded theory about how children process information and comprehend the content presented in nonfiction texts.

Running Records

Children's oral reading behaviors were recorded on running record forms. The following sections describe the procedures for recording, scoring, and analyzing the children's reading responses. The processing terms signifying the behaviors are defined.

Recording Running Records

Written observations of children's oral reading behaviors represent how the children were processing information while reading the nonfiction books. Standard procedures for recording and scoring running records are necessary to ensure that calculations regarding the level of accurate reading are reliable (Clay, 2002). Clay (2002) calculated the reliability of error scoring as 0.98; reliability of self-correction rate was calculated as 0.68. The standard recording procedures outlined in An Observation Survey

(Clay, 2002)³ were followed in order to make reliable comparisons of multiple readings by each student. Symbols and abbreviations are used to represent oral reading responses when recording running records. Examples include:

A check, ✓ indicates correct reading

Child: ✓ ✓ ✓

Text: Fish lay eggs.

Erica's accurate reading response is recorded on top of the text that she read correctly.

The following notation indicates that Christopher made an error when he substituted the word *our* for *a*.

Child: our

Text: a

SC indicates that the child self-corrected the error. Christopher self-corrected his

error:

Child: our | SC

Text: a

As a child was reading, comments and nonverbal gestures, were recorded; running records need to cover more than just what the child read (Clay, 2002). Recorded errors and self-corrections along with other behaviors provided a defined and thorough

³ For a detailed description of recording, scoring and analyzing Running Records the reader may refer to Clay, M. M. (2002). *An Observation Survey of early literacy achievement* (2nd ed.). Portsmouth, NH: Heinemann.

description of each child's processing and comprehending while reading. The following notation depicts Erica's attempts to solve *fur*.

Child: ✓ ✓ f, (looked at picture) ✓.
Text: Bats have fur.

She hesitated articulated the sound for F, looked at the picture and solved *fur*. The behaviors noted along with the check mark provided me with additional insight about Erica's attempts to solve *fur*.

Spontaneous comments made while reading were noted. After Erica read the sentence that began *Snakes lay eggs*, she looked at the photograph of baby snakes and commented, "They're kind of cute."

Running records were recorded using the conventional notations described by Clay (2002). Additional responses and behaviors were noted on the running record sheet and compared to the audio and video tapes for confirmation. Details and behaviors observed on the taped recordings provided for a rich description (Erlandson et al., 1993) of the children's processing behaviors, more than handwritten notes alone could supply.

Scoring Running Records

Running records were scored for accuracy using the following procedure (Clay, 2002). Calculations from Erica's reading are depicted in the example below; her running record is located in Appendix E.

1. Count the total number of words in the main body of the text, omitting titles.

Erica read 53 words in What Lays Eggs? (Gracestone, 1998)

2. Count the number of errors and enter the Error Ratio

She made 10 errors. $10/53$ is a 1:5.3 error ratio.

3. Use the conversion table to find the Accuracy Rate

80% accuracy.

4. Calculate the Self-correction Ratio

Erica did not self-correct any errors.

After each child's session was completed, I calculated the child's accuracy rate on the running record form.

Analyzing Oral Reading Behaviors

Clay specifies sources of information (Clay, 1991), similar to Rumelhart's knowledge sources (Rumelhart, 1994), that readers use to understand written language. Readers may use sources of information alone or simultaneously to maintain effective, accurate reading, as well as to solve unfamiliar words, phrases, or passages. Running records are analyzed to determine sources of information a child may use to read.

Meaning, structure and visual information are the sources of information teachers consider when analyzing children's oral reading.

1. Meaning - Meaning (semantics) the most essential and significant source of information (Clay, 1991; Goodman, 1994; Smith, 1994) involves comprehending or making sense of the text. Readers use their knowledge of and experiences "outside" of the text to comprehend what they are reading. Life experiences and knowledge of oral and written language registers and structures may be used to construct meaning during reading (Clay, 1991; Goodman, 1994; Smith, 1994).

2. Structure - Grammatical knowledge (syntax) that allows the child to predict how the language or story structure may go (Clay, 1991; Goodman, 1994; Smith, 1994).

3. Visual - Visual information consists of: (a) Graphics – information received from the visual features of print includes letter features, letters, letter clusters, words, repeated phrases, spaces between words, punctuation or illustrations (Clay, 1991; Goodman, 1994; Smith, 1994); (b) Phonological – *phonological awareness* is defined as “awareness of the constituent sounds of words” (Harris & Hodges, 1995). Readers may use phonological information from several levels of language including letters, digraphs, clusters, syllables, prefixes and suffixes, root words, phrases, and nonlanguage strings (Clay, 1991; Goodman, 1994; Smith, 1994).

Analyzing errors can tell us what sources of information a child is attending to when reading. The analysis provides evidence of how a child is processing information during reading and how the child is linking what is known to novel concepts during reading. Use or neglect of meaning and/or structural information may be especially relevant as children are reading nonfiction books.

Child: Bats can leave in a cave.

Text: Bats can live in a cave.

The error indicates that the Carley was influenced by:

1. Meaning - bats do leave caves; the photograph depicts bats flying around the opening of a cave.
2. Structure - the substitution is grammatically correct up to the point of error.

3. Visual information - *look* and *leave* begin with the same letter and end with the same cluster of letters.

Analysis of self-correction behaviors can reveal what extra or additional information was used to solve the word.

Child: Bats can leave in a cave. Bats can live in a cave.

Carley's self-correction indicates that she may have used additional:

1. Meaning - *bats can live in cave* makes more sense than *bats can leave in a cave*.

2. Visual Information - attended to the middle part of the word realizing that her language did not match the print.

Processing Terms

Self-monitoring, searching and *self-correction* are terms used to describe children's processing while reading. They were used to represent processing on the running record forms.

1. Self-monitoring occurs when a child evaluates the attempts made while reading, by "attending to the situation and noticing when things aren't quite right" (Schwartz, 1997). Self-monitoring is assumed when a child is reading accurately. It may be observed when a child stops or give signs of uncertainty (Clay, 1993b).

After substituting *at/eat* Erica hesitated. She noticed that something didn't fit. The hesitation indicates that Erica monitored her reading.

2. Searching refers to the gathering of information, used for the first attempt to read, to make successive attempts by looking for more information and to self-correct (Clay, 1991; Schwartz, 1997).

When Erica came to *fur* she articulated the first sound of the word, /f/, then looked at the picture. She searched for phonological information at the letter level and made a subsequent search for meaning by looking at the picture.

3. Self-correction refers to the rejection of an error response. When a child realizes an error has been made a subsequent search is conducted in an attempt to solve the word correctly (Clay, 1991).

Christopher read *our/a*; he quickly made a subsequent search and read *a*. He self-corrected his error.

Other Behaviors

Observable behaviors while problem solving words were analyzed to provide a more detailed and comprehensive representation of the reading process. Those behaviors include verbal behaviors, such as articulation of letter and cluster sounds or attempts at the word level. Erica articulated /s/ to solve *sleep* when she read:

Bats s-sleep all day.

Nonverbal behaviors were observed and recorded. Looking at the picture to solve words was included in the analysis. Carley searched the picture for meaning to solve *feathers*:

An owl has, (looked at picture) feathers.

Spontaneous comments made while reading, quick glances at the illustrations before, during or after reading a page, pauses and finger pointing to words were noted on the running record form but not analyzed.

Clay (1993a) advises researchers that, “the most reliable records would be obtained by scoring an observation immediately following its manual recording and rechecking immediately with a taped observation” (p. 28). Immediately following each student’s session, I reviewed the audio tapes to confirm my handwritten notations. I added responses that I had omitted or had not initially heard. When Erica was attempting to solve *mosquitoes* she queried, “I wonder what that’s called.” I had not heard that during the actual text reading; her inquiry was added to the running record of oral reading.

Recorded observations of children’s behaviors while reading were analyzed to determine how they processed information as they read the nonfiction books. Initial analysis occurred immediately following each reading response session. A more detailed analysis took place as the data were compiled and organized.

Categorizing and Coding Text Reading Behavior

A doctoral student acted as a categorizing interrater. Interrater agreement for categorizing and coding processing represented by oral reading behaviors was established at 97%. The procedures described in the section below were followed for an in-depth analysis of reading responses.

Audio and videotapes were used to confirm handwritten notes. Notes were edited accordingly to ascertain the children’s oral reading and responses.

Each child's entire reading response session was transcribed and entered onto a *Word*® document using the audiotapes. The transcript from Erica's What Lays Eggs? (Gracestone, 1998) session is in Appendix E. I began this process in the evenings as the data were being collected. Observations of the children's oral reading behaviors and actions noted on the running record were included in the transcription.

The videotapes were studied for corroboration with the combined handwritten and audio transcripts. Interview responses and behaviors were entered and edited as I observed the recordings. I viewed each child's tapes from beginning to end, while referring to the transcription. The videotapes were especially helpful if I had difficulty deciphering a child's comments on the audio recording. Erica's reading What Lays Eggs? (Gracestone, 1998) was reviewed to clarify her attempts to solve *after*:

af af-t-er and the -t- if you put the -er- and the -t-er-er-er- so I think it's called
She made several attempts and I wanted to have them noted accurately. I frequently referred to the video tapes for clarification as I was organizing and categorizing the data.

Transcripts compiled from all of the data sources were entered onto an *Excel*® spreadsheet for a more detailed analysis of reading behaviors. The format used in *Word*® facilitated the organization of data onto a worksheet entitled *Processing*. Erica's Processing Table is in Appendix E. I began by entering the child's reading behavior

using the conventional running record notations. For reference, corresponding page numbers and a description of the illustration on each page were entered.

Location in Book	Picture	Reading Behavior
7	Diagram - stages of fish hatching	<u>Mommy m-ost, must</u> ✓ ✓ ✓ ✓ ✓ Most fish do not look after <u>the, they</u> ✓ their eggs.
✓ - accurate reading		

Sources of information were entered next. At times, a child made multiple attempts to solve a particular word. The data were coded with abbreviations that designated the child's reading behaviors; Meaning (M), structure (S), and visual information (V). *Initial Sources of Information* indicates the initial knowledge sources a child may have used to solve a word or the sources used with an error substitution that was subsequently self-corrected. *Final Sources of Information* indicates the final sources of information used in problem solving attempts or self-corrections.

Reading Behavior	Initial Sources of Information	Final Sources of Information
<u>Mommy m-ost, must</u> ✓ ✓ ✓ ✓ ✓ Most fish do not look after	M S V	M S V
<u>the, they</u> ✓ their eggs.	M S V	M V
✓ - accurate reading		

Erica initially searched for meaning (M), structure (S), and visual (V) information when she substituted *the/their*; her final attempt, *they/their* resulted in an error using meaning and structure.

Single attempts, single substitutions of words, and accurate reading were included in the final, rather than initial sources of information category. The final sources of information field was left blank if the child added or was told a word.

Reading Behavior	Initial Sources of Information	Final Sources of Information
Fish lay eggs. Fish lay eggs.		M S V
mouth m-o, I Wonder what that's called mosquitoes	R T	V
R - Repeat T - Told		

Parallel and Successive Processing

Parallel and successive processing refer to how a child monitors and searches for information to facilitate the reading process. The terms reflect attention given to the task of reading or solving words.

Parallel processing signifies the simultaneous use of multiple knowledge sources, that is characteristic of a “highly interactive parallel processing system” (Rumelhart, 1994). Parallel processing occurs when reading is accurate with no overt attempts at problem solving. Errors indicating a search for several sources of information at once are considered parallel processing. Parallel processing is an indication that little attention is directed toward solving words; reading is proceeding smoothly, without apparent difficulty. Erica’s substitution *they/their* indicates parallel processing.

Reading Behavior	Initial Sources of Information	Final Sources of Information	Type of Processing
✓ ✓ ✓ ✓ ✓ <u>they</u> eggs. Mosquitoes do not look after <u>their</u> eggs.		M V	parallel
✓ - accurate reading			

Substitutions made with no overt attempts or observable interruptions in oral reading were categorized as parallel processing.

Successive processing is applied by young children as they learn to become readers. Instead of accessing or using information from several sources at once, they attend to one piece of information at a time in a series of actions (Clay, 2001). Erica made successive attempts when trying to solve *most*. The final substitution indicates successive processing. Multiple attempts at solving or self-correcting words were categorized as successive processing.

Reading Behavior	Initial Sources of Information	Final Sources of Information	Type of Processing
Mommy m-ost, must Most	M S V	M S V	successive

Parallel and successive processing are terms used to describe how the children accessed the various sources of information while reading. They were entered onto the spreadsheet accordingly.

Reading Quality

Although some categories were designated beforehand, others emerged as reading behaviors were analyzed. As the data were coded and entered in the spreadsheets I began searching for overall patterns of responses for individual children as well as the sample (Clay, 2002), to describe and then interpret the children's text reading behaviors.

Errors and self-corrections of children's oral reading were analyzed according to the procedures outlined by Clay (2002) in An Observation Survey to determine the

sources of information the children may have used when reading the books. They are: meaning, structure, and visual information. I analyzed overt problem-solving behaviors by designating sources of information used by the children to solve words. Names that derived from the observed patterns of processing were chosen to suggest the resultant reading quality in terms of meaning, structure, and visual information. “One can conceive of some errors being better than others depending on which relationship one prefers to stress” (Clay, 1991, p. 294). The category *reading quality* is defined as the final attempt at reading or solving words reflected by the construction of meaning. The reading quality terms were labeled according to my beliefs and perspectives, filtered through my world view (Merriam, 1998). I believe that reading is a meaning driven process. Meaning plays a central role as the reader seeks to understand the printed message. The labels in Table 8 were shaped by my belief that the construction of meaning is suggestive of reading quality.

Table 8

Reading Quality: Processing

Term	Definition	Sources of Information
Accurate	Reading was accurate with no observable attempts to solve. Assumes the child monitored and searched with several sources of information.	M S V
Solved	Behavior indicated that the child searched for additional information when attempting to solve a word. The word was solved successfully.	M S V
Self-Correction	The child self-corrected an error. Indicated that the child monitored and conducted a subsequent search to self-correct.	M S V
Meaningful Approximation	Error analysis indicated the child searched for meaning with or without structure or visual information.	M S V M S M V V
Approximation Neglected Meaning	The child searched for structure and/or visual information; meaning was lost.	S V S V
Less Productive Attempt	The child successively searched and monitored information when attempting to solve a word. The subsequent attempts resulted in a told.	V
Addition	The child added a word to a line of text. Additions were not analyzed as a type of word error (Clay, 2002).	
Note: The letters M, S and V refer to meaning, structure and visual information; sources of information used by the child when reading.		

Accurate reading refers to correct reading. Erica read the sentence *Fish lay eggs* accurately with no overt attempts at problem solving. An entire page read correctly was labeled accurate reading.

Names were assigned to each overt problem-solving attempt on a page. They are solved, self-correction meaningful approximation, approximation neglected meaning, less productive attempt and addition.

A word was *solved* when overt attempts were observed. Carley solved feathers correctly after glancing at the picture. She used meaning, structure and visual information to solve *feathers*.

An owl has, (looked at picture) feathers.

Self-correction means that a prior error was corrected. Carley reread to self-correct the error substitution *leave/live* using three sources of information.

Child: Bats can leave in a cave, Bats can live in a cave.
Text: Bats can live in a cave.

An error that was influenced by meaning, with or without other sources of information, was labeled *meaningful approximation*. Analysis of Erica's substitution indicates that she searched for meaning and visual information. The error was not grammatically correct.

Child: Mosquitoes do not look after they eggs.
Text: Mosquitoes do not look after their eggs.

An error made without meaning that was grammatically and/or visually correct was labeled *approximation neglected meaning*. Meaning was absent when Carley substituted *mont/most*.

Child: Mont fish look after their eggs.
Text: Most fish look after their eggs.

A *less productive attempt* occurred when a child made successive attempts to solve a word or sat still with no overt attempts observed. The child was told the word. Erica attempted to solve *after* using graphic and phonological information at the letter and letter cluster levels. After several attempts, she was given a told.

af af-t-er and the -t- if you put the -er- and the -t-er-er-er- so I think it's called

An *addition* was made when a child added a word to a line of text. Christopher added *snow* to the following text.

Child: We put on our snow hats.
Text: We put on our hats.

The category reading quality was generated and labels entered onto the spreadsheet.

Type of Word

The category *type of word* distinguishes technical terms from other words.

Technical terms are lexical items presented in a nonfiction book (Pappas, 1993) that correspond to the specific content; technical terms refer to the vocabulary words found in the books. Technical terms presented in the books were selected from the books' glossary, index and table of contents; additional terms that reflected the specific content were included as well. A doctoral student considered the list of words I generated. After

reviewing the books, she recommended some that I had overlooked. Her suggestions were added to the list. Interrater agreement was 97% before the words were added.

The total number of times technical items appeared in the books was calculated. An item was counted each time it appeared on a page of text. *Eggs, snakes, fish, snails, mosquitoes* and *chickens* were designated as technical items presented in What Lays Eggs? (Grestone, 1998). *Eggs* appeared 11 times; the other words appeared for a total of 10 times. Technical items appeared 21 times in the book. The remainder of the words were labeled *other*. Examples of other words include: *see, on, can, has, after, their, and live*.

Christopher substituted both technical terms and other words when reading Our Farm (Stango, 2001).

Location in Book	Reading Behavior	Type of Word	Word
4	We see (LAP) pumpkins on the shelf. We see pumpkins on our farm.	other	our
		technical	farm
5	We see a cow on the hay. We see a cow on our farm.	other	our
		technical	farm
LAP – looked at picture			

Categorizing and Coding Conversations

Categorizing and coding interview conversations began as the data were being collected and continued throughout the study (Erlandson et al., 1993). Audio and videotapes were used to confirm, edit and establish the children's oral reading and interview responses. The data were "examined and compared for similarities and

differences" (Strauss & Corbin, 1998, p. 102) as it was entered on *Word*® documents and compiled and organized in *Excel*® spreadsheets. Transcripts of Erica's interview responses are located in Appendix E. Interrater agreement of interview responses was 98%.

Conversations during interviews were recorded on handwritten fieldnotes and audio and videotapes. Immediately following the last session each day I reviewed the audiotapes to confirm my handwritten notations while supplying additional details that had been overlooked during our conversations. As I was listening to Erica's conversation after reading What Lays Eggs? (Gracestone, 1998), I discovered that she recognized similarities about snail and snake eggs cracking open.

The children's responses were transcribed onto a *Word*® document while listening to the audiotapes; this process began in the evenings as the data were being collected. I transcribed each session in sequence, beginning with the introduction and preview, followed by the text reading response and ending with the after reading interview. Our conversation during interviews was transcribed into a *Word*® document, segmented by language units (Miles & Huberman, 1994) that contained a meaningful thought, idea or detail stated by either the child or me. Erica's statement about snails' eggs consists of a complete thought.

"And snails can even their eggs can come from their body to down for, for, for the eggs to come out of their bodies to the eggs to crack open."

Single words were considered meaningful units. Erica related animals that can lay eggs. *Frogs, crabs, butterflies, snakes and fishes* were each designated as an individual language unit.

Within a week, I viewed the videotapes from the beginning to end of each child's session, in sequence, for further confirmation. I referred to the transcription documents, paying particular attention to instances where I was not clear about what occurred, while noting additional observations. On subsequent viewings I noted the times a child looked or pointed to a specific location in a book. I had not observed Erica looking at the picture when previously reviewing the videotape.

Child: Snakes, snakes, snakes (looked at picture), lay eggs.
Text: Snakes lay eggs.

A subsequent review revealed that Erica looked at the picture for support either to confirm her attempt at *snakes* or to solve *lay*.

Table 9 depicts the coding categories that described the children's behaviors and responses before, during, and after reading. The categories are defined in the following sections.

Table 9

Coding Categories

Before	During	After
Topic	Processing	Topic
Location in the Book	Parallel	Location in the Book
Page number designates	Successive	Page number designates
Text	Reading Quality	Text
Picture	Accurate	Picture
Outside Related	Solved	Outside Related
Cover	Self-correction	Cover
Title Page	Meaningful Approximation	Title Page
With/without Book	Approximation Neglected Meaning	Familiarity
Page Number	Less Productive Attempt	Known
Without	Addition	Child
	Type of Word	Researcher
	Technical Item	New
	Other	Other
		Misunderstood
		General Comment
		Beyond Text
		Knowledge Refined
		Confirmed
		Designated
		Extended

Table 9 (Continued)

Before	During	After
With/without Book		
		Page Number
		Without
		Flipped Through
	Definition	Responding Behavior
	Stereotyped responses to words suggesting a specific meaning or concept.	Picture
	What the topic is about.	Picture and Self
	What the book is about.	Self
	Mental representation of the book.	Addition
	Topic is represented by a picture.	Does Not Apply
Reading Quality		
		Accurate
	The child related the topic of the book to the one or two topics found in the book.	Solved
	The topic is represented by a picture.	Self-correction
	The topic is represented by a picture.	Meaningful Approximation
	The author's definition of the topic is correct but the meaning is not fully understood.	Approximation Neglected Meaning
	Specific page is mentioned.	Less Productive Attempt
	The child did not respond to the question.	Addition
		Does Not Apply

Conversations before Reading

Table 10 represents the terms used to categorize the children's conversational responses before reading.

Table 10

Reading Interview Conversation: Introduction

Term	Definition
Topic	Statements made by the child or researcher that suggest a specific idea or theme.
Location In The Book	Where the topic, detail or fact was found in the book.
Page Number	Numerical representing the specific page number in the book.
Text	Text is presented in the book.
Picture	Topic is represented by the illustrations/photographs.
Outside Related	The child referred to a topic that is not presented in the book, in illustrations or text, but is related to content found in the book.
Cover	The topic is represented by the cover illustration.
Title Page	The topic is represented by the title page illustration.
With/without Book	The action a child took with a book when speaking; a comment was made while referring to the book or without it.
Page Number	Specific page a child went to in the book.
Without	The child did not refer to the book.

The children's responses were transferred to an *Excel®* spreadsheet in the meaningful units arranged in the *Word®* documents. Erica's introduction is in Appendix

E. The content or topic of our language, arranged by meaningful units, was placed in the category *topic*. *Location in book* refers to where the topic, detail or fact was found in the book. *Page numbers* with corresponding *text* and/or *picture*, *cover* and *title pages* were labeled accordingly.

At times a child would mention a topic, or detail that was related to the book's content but not specifically presented therein. As the children's responses were being compiled *outside related* was added to denote comments the children made that were related to the book's content but did not specifically appear in the text itself. This includes comments made about the cover or title page that had no corresponding text in the book. The field was left blank if the topic was not related to or presented in a book's content.

With/without book indicates the action a child took with a book when speaking; a comment was made while referring to the book or without it. *Without* means that the book remained closed; the child did not look at it or refer to a precise location. Page numbers with corresponding text and/or picture, cover and title pages were entered in the with/without book category to indicate where a child went in a particular book.

Location in Book	With/without Book	Transcript	Topic
4 text picture	without	snakes	snakes lay eggs
outside related	without	Even, even like ducks can lay eggs.	ducks lay eggs

The topic, snakes lay eggs, was presented in What Lays Eggs? (Grestone, 1998) as text and in photographs. The fact that ducks lay eggs was related to the books content, but did not appear in the text.

Researcher was entered to indicate times that I was speaking, all other responses were the child's. Space was made for notes, where I added details regarding the responses.

Preview the Book

Similar data were entered into the preview sheet as well. Erica's preview of What Lays Eggs? (Grestone, 1998) is in Appendix E.

Location in Book	With/without Book	Transcript	Topic
cover	cover	I've seen one of these on Miss Spencer's book .	birds
2 picture	2	Oh, I forgot to tell you one more thing. Frogs can even lay eggs.	frogs lay eggs

The creation of the introduction and preview spreadsheets enabled me to easily see the relationship between responses made before and after reading.

Conversations after Reading

Audio recordings were transcribed onto a *Word®* document following the same procedure used with the introduction conversations. Meaningful units of conversation were transferred from *Word®* into an *Excel®* spreadsheet. Names or labels for the categories "should be suggested by the context in which an event is located" (Strauss & Corbin, 1998, p. 106). Similar responses were grouped together to facilitate category formation; as this process continued terms reflective of the responses began to emerge.

Throughout the analysis process, category names were revised several times to find the “most logical descriptor[s]” (Strauss & Corbin, 1998) to represent the children’s responses. The categories topic, with/without book, reading quality and notes from prereading conversations and the processing data were included in the after reading analysis. The term *flipped through* was added to the with/without book category to designate times a child fanned or flipped through the pages while speaking.

Open coding refers to the process of identifying and naming the concepts presented in the data (Strauss & Corbin, 1998). During the process of open coding, conversational responses were categorized according to how a topic was known to a child. They are labeled *known* (by the child or researcher), *new* and *other*. The broader category *familiarity*, designated during axial coding (Strauss & Corbin, 1998), was used to represent how the information was known. The table with Erica’s after reading conversation is located in Appendix E. Table 11 depicts the subcategories under familiarity.

Table 11*Familiarity*

Term	Definition
Known	A topic or information that was mentioned by the child or the researcher prior to the oral text reading.
Child	A topic presented in the book was mentioned in the introduction or preview by the child.
Researcher	The researcher mentioned the topic in the book introduction.
New	Topic or details that were not mentioned before the text was read. Response may include topics that are specifically presented in a book or related to a book's contents. (The response may reflect new learning or be a confirmation or extension of a previously known topic.)
Other	Responses that did not fit clearly into known or new knowledge.
Misunderstand	The child's verbal response indicated a misunderstanding of a topic presented in the book.
General Comment	The child made a general comment about the text.
Beyond Text	Child's attention was directed elsewhere - not related to the book.
With/without Book	The action a child took with a book when speaking; a comment was made while referring to the book or without it.
Page Number	Specific page a child went to in the book.
Without	The child did not refer to the book.
Flipped Through	The child fanned or flipped through the pages, without referring to a specific location.

Children's interview responses made before and after reading were examined to determine how the knowledge or information discussed was known to a child. Familiarity refers to how and when a specific item, detail, or topic was discussed; familiarity was represented by oral responses. Two broad subcategories, known and new depict

previously stated knowledge or new topics. A third subcategory other denotes responses that did not fit clearly into known or new knowledge.

Known knowledge was divided into two components, *child* and *researcher*. Child refers to knowledge related by the child during the introduction or preview. During the What Lays Eggs? (Gracestone, 1998) introduction, I asked Erica, "What are some animals you know that lay eggs?" She replied, "Birds, turtles, snakes..." After reading she mentioned snakes again, "Snakes lay eggs."

Location in Book	Transcript	Topic	Familiarity	With/without Book
4 text picture	Snakes	snakes lay eggs	child	4

Details or topics mentioned by me in the introduction were labeled researcher. During the introduction I said, "I know that many animals lay eggs. Mosquitoes and butterflies are some animals I know that lay eggs." After reading I asked Erica to tell me what was new to her. She replied, "I didn't know that these were mosquitoes..." Erica related information that was originally expressed by me.

Location In Book	Transcript	Topic	Familiarity	With/without Book
10 text picture	Um well I noticed that that I didn't know that these were mosquitoes. I know what they are called I just kind of forgot it	mosquitoes lay eggs	researcher	10

New knowledge refers to details, topics or information that were not mentioned by the child or researcher prior to reading. Knowledge in this category may or may not be previously known to a child; it does not necessarily mean new learning occurred.

Whether the knowledge was previously known or not, the child's comments indicate that attention was directed to the meaning conveyed in the book.

Location In Book	Transcript	Topic	Familiarity	With/without Book	Notes
3 picture	crabs	crabs lay eggs	new	3	illustration depicts

The fact that crabs lay eggs had not been mentioned by Erica or me before she read the book.

Subcategories within other were created for responses that did not correspond to either known or new knowledge. *Misunderstood* indicates that the child misunderstood what was presented in the text. Erica's comment, "Butterflies lay eggs," was a misunderstanding; a photograph of a moth was inserted on page 3. This misunderstanding was probably due to my comment in the introduction, "butterflies are some animals I know that lay eggs."

Location In Book	Transcript	Topic	Familiarity	With/without Book	Notes
outside related	butterflies	butterflies lay eggs	other	3	misunderstand moth in illustration; researcher said butterflies in the introduction

Erica made a *general comment* after reading Bats, Bats, Bats (Olearczyk, 2001), “A lot of things are new in this bat, bat book.”

Location In Book	Transcript	Topic	Familiarity	With/without Book	Notes
outside related	A lot of things are new in this bat, bat book.		other	flipped through	general comment

Christopher went *beyond the text* after reading Time for Bed (Nowak, 2002). I asked, “Was there any other part that you liked?” He replied, “Right here, right here he got cut when he was holding me up in the waves.”

Location in Book	Transcript	Topic	Familiarity	With/without Book	Notes
	Right here, right here he got cut when he was holding me up in the waves.		other	without	beyond text

Responding behaviors refer to what a child did with the book when responding. Table 12 lists the observed responding behaviors that children used when relating or talking about the contents of a particular book.

Table 12

Responding Behavior

Term	Definition
Picture	The child looks at and/or points to the picture while making a simple statement without adding details.
Picture and self	The child verbally connects text or a related topic (not in book) to life or personal experiences while referring to the picture.
Self	The child verbally connects text or a related topic (not in book) to life or personal experiences.

Observation of children's responding behaviors were recorded and analyzed to discover how they might comprehend the information presented in the nonfiction books. Names of categories may develop when an analyst "has an insight that seems to explain what is going on" (Strauss & Corbin, 1998, p. 115). Terms labeled during open coding (Strauss & Corbin, 1998) suggest what might have influenced a child's particular response, to facilitate comprehending or construction of meaning regarding a book's content. They are: *picture*, *picture and self*, and *self*. *Responding behavior*, created during axial coding (Strauss & Corbin, 1998), refers to what the child did with the book. The behavior reflects what prompted or brought about a particular response.

Children frequently referred specifically to a picture in the book as they related ideas, facts, and details to me. These references are labeled *picture*. On two occasions a child pointed to a picture with no verbal comment. This infrequent behavior was noted,

but not included in the analysis. It was difficult to ascertain what might have influenced the action without a corresponding oral response

Prior knowledge is “knowing that stems from previous experience” (Harris & Hodges, 1995). I assume that everything a child says is related to personal experience and knowledge of the world. Picture, picture and self and self, suggest the influence that might have prompted a child’s response.

The children frequently responded with the book open while looking and/or pointing to a picture. Picture refers to a statement referring to the picture; personal experiences were not related. Erica looked and pointed to the photograph of mosquitoes saying, “mosquitoes,” in response to my question, “Is there anything else that was new to you?” She did not add personalized details.

After Reading Conversation				
Location in Book	Transcript	Topic	Responding Behavior	With/without Book
10 text picture	mosquitoes	mosquitoes lay eggs	picture	10

Picture and self, denotes times a child added details relating to previous experience, while referring to the picture. After reading Bats, Bats, Bats (Olearczyk, 2001), Erica looked and pointed to the cover relating personal experience, "Even bats on, on DVD's can turn into vampires."

After Reading Conversation				
Location in Book	Transcript	Topic	Responding Behavior	With/without Book
outside related	Even, even bats on, on DVD's can turn into vampires.	vampire bats	picture and self	cover

Self refers to a response relating to a child's personal experiences, with the book closed. Erica's comment, "And also that fishes can lay eggs from many different ponds or different lakes," was probably prompted by prior knowledge or *self*. Ponds and lakes were not represented in the book, either in the text or pictures. Her speech was the behavior indicating that the response was facilitated by personal knowledge or information known outside of the text.

After Reading Conversation				
Location in Book	Transcript	Topic	Responding Behavior	With/without Book
outside related	And also that fishes can lay eggs from many different ponds or different lakes	fish lay eggs in water	self	Without

With/without book was included in this table, to serve the same purpose as in the introduction tables. With/without book was used as a reference to see at a glance if or where the child went in the book.

After Reading Conversation			
Location in Book	Transcript	Topic	With/without Book
12 text picture	chickens	chickens lay eggs	12
outside related	Well any different kind of animals that doesn't lay eggs that means that they didn't find a husband yet	different animals lay eggs; mates	without

*Knowledge refined*⁴ refers to how a child's knowledge was verified, changed, shifted or expanded after reading the nonfiction book. Table 13 represents the subcategories labeled during open coding that fall under knowledge refined.

⁴ Jerome Bruner (1977) discusses the act of learning as an act involving three simultaneous processes; the first is *acquisition*. Acquisition of new information may be contrary to or replace information that is previously known, "violating" previous beliefs. Learning about Newton's laws of motion may "violate the testimony of the senses". Frequently the situation is not as "drastic". Bruner provides an example of a student who has a vague notion of the circulatory system learning details about the circulatory system. Acquisition of new information may simply be a "refinement of knowledge".

Table 13 Knowledge refined: comprehension or construction of meaning from the content of nonfiction books

Knowledge Refined

Term	Definition
Known Knowledge	A topic or information that was mentioned by the child or the researcher prior to the oral text reading.
Confirmed	The child restated knowledge categorized as known without adding details. This includes details mentioned by the child or the researcher before reading.
Extended	The child elaborated or extended knowledge categorized as <i>known</i> . This includes details mentioned by the child or the researcher before reading.
New Knowledge	Topic or details that have not been mentioned before the text was read. Response may include topics that are specifically presented in a book or related to a book's contents. (The response may reflect new learning or be a confirmation or extension of a previously known topic.)
Designated	New knowledge related as a single word or simple statement by the child without elaboration.
Extended	New knowledge that a child extended or elaborated.

As the data were being organized and coded, I noticed patterns regarding the detail provided by the children when commenting about a book's content. Four broad subcategories labeled during open coding (Strauss & Corbin, 1998) represent how the children's knowledge changed after reading the nonfiction books. The children *confirmed* and *extended* known knowledge; they *designated* and *extended* new knowledge. The subcategories were linked during the process of axial coding (Strauss & Corbin, 1998) resulting in the formation of knowledge refined. *Knowledge refined* refers to how a child's knowledge was verified, changed, shifted, or expanded after reading the book.

Knowledge refined reflects comprehension or construction of meaning from the contents presented in a particular nonfiction book.

Known knowledge was confirmed when no additional details were added to a single word or a simple statement. Erica named “frogs” as animals that can lay eggs. She confirmed knowledge that she had mentioned while previewing the book, with a single word, *frogs*.

Preview			
Location in Book	With/without Book	Transcript	Topic
2 picture	2	Oh I forgot to tell you one more thing. Frogs can even lay eggs.	frogs lay eggs

After Reading Conversation				
Location in Book	Transcript	Topic	Familiarity	Knowledge Refined
2 picture	Frogs	Frogs lay eggs	child	confirm

A child extended known information when details were added to knowledge mentioned by either the child or the researcher during the book introduction. Erica extended knowledge about fish laying eggs. In the preview she related that, “fish or sharks... can lay eggs.” She extended that knowledge after reading the book, “fishes can lay eggs from many different ponds or, or different lakes.”

Preview			
Location in Book	With/without Book	Transcript	Topic
6 text picture	4	fishes or sharks	fish lay eggs

After Reading Conversation				
Location in Book	Transcript	Topic	Familiarity	Knowledge Refined
outside related	And also that fishes can lay eggs from many different ponds or or different lakes.	fish lay eggs in water	child	extend

New knowledge related as a single word or simple statement by the child without elaboration was termed designate. Erica designated new knowledge when she pointed to an insert photograph of a crab and said, “crabs.” The fact that crabs lay eggs had not been mentioned by either one of us before she read the book.

After Reading Conversation				
Location in Book	Transcript	Topic	Familiarity	Knowledge Refined
3 picture	Crabs	crabs lay eggs	new	designate

Extend refers to new knowledge that a child extended or elaborated. Erica extended new knowledge about owls’ claws, “Owls can have sharp claws that can like that like can scrape people.” She added details to the fact that owls have sharp claws.

After Reading Conversation				
Location in Book	Transcript	Topic	Familiarity	Knowledge Refined
4 text	Owls can have sharp claws that can like that like can scrape people that comes near these kind of owls	owls’ sharp claws	new	extend

Reading quality is the final attempt at reading or solving words reflected by the use of or construction of meaning. Table 14 lists the reading quality terms signifying the

children's oral reading responses. The terms were entered into the after reading spreadsheet, to obtain a general representation of processing at the page level.

Table 14

Reading Quality Terms: After Reading

Term	Definition
Accurate	Reading was accurate with no observable attempts to solve. Assumes the child monitored and searched with several sources of information.
Solved	Behavior indicated that the child searched for additional information when attempting to solve a word. The word was solved successfully.
Self-Correction	The child self-corrected an error. Indicated that the child monitored and conducted a subsequent search to self-correct.
Meaningful Approximation	Error analysis indicated the child searched for meaning with or without structure or visual information.
Approximation Neglected Meaning	The child searched for structure and/or visual information; meaning was lost.
Less Productive Attempt	The child successively searched and monitored information when attempting to solve a word. The subsequent attempts resulted in a told.
Addition	The child added a word to a line of text.
Varied	The child made an observable attempt to solve and/or substituted multiple words presented on a page. Several behaviors depicting quality of reading were recorded.
Does Not Apply	No direct reference to a particular page in the book; no reading behavior to analyze. This also includes a reference to the cover or title page. If the illustration depicts something in addition to the text that the child mentions, the text reading for that page will be analyzed. It will not be considered does not apply.

Reading quality was entered in this table to determine the relationship between responses made during and after reading. I referred to the processing table to locate reading quality for the corresponding pages of text. Two other terms were added. *Variety* was created to account for a page of text where a child solved multiple words. Erica's attempts on page 5 in What Lays Eggs? (Gracestone, 1998) were varied. *Mommy/most* and *the/their* were meaningful approximations. She was told *after* resulting in a less productive attempt.

Child: Mommy snakes look af af-t-er and the -t- if you put the -er-
 Text: Most snakes look after

Child: and the -t-er-er-er- so I think it's called after
 Text: after Told

Child: the-ir, the eggs.
 Text: their eggs.

After Reading Conversation			
Location in Book	Transcript	Topic	Reading Quality
5 picture	See look, like hey see (points to baby snake coming out of the egg) like see like the the baby snakes, like the baby, like the baby snake is cracking open that bubble, is because that blowing on 'im because because because its trying to	snake eggs hatch	varied

Does not apply corresponds to outside related. Outside related was termed when the introduction responses were organized and analyzed to signify a response that was

related to a book's content but not specifically presented therein. Responses that did not correspond to text reading were labeled does not apply. Erica's comment, "Well any different kind of animals that doesn't lay eggs that means that they didn't find a husband yet," is related to the book's topic. There was no corresponding text in What Lays Eggs? (Gracestone, 1998)

After Reading Conversation			
Location in Book	Transcript	Topic	Reading Quality
outside related	Well any different kind of animals that doesn't lay eggs that means that they didn't find a husband yet	different animals lay eggs; mates	does not apply

Processing and Comprehending Association

Two research questions guided the inquiry in this study.

1. How do early readers process information while reading nonfiction books?
2. What do children's responses reveal about comprehending nonfiction books?

When the analysis was completed I merged the data used to answer the two research questions to develop a clearer and more comprehensive picture of how children process information and comprehend the content presented in nonfiction texts. The categories remained the same as the data were reorganized. The Processing Comprehending Association tables were organized according to familiarity and knowledge refined (see Appendix E). Within each of those sections I looked at reading quality at the page level and the children's corresponding responding behaviors. The notes section designated how many responses were influenced by my comments. For example, there were three instances when a child went to a picture while relating personal

experiences. Information introduced by the researcher was related one of those times.

Frequencies were calculated for each of the categories included in the tables.

“A central category has the ability to pull the other categories together to form an explanatory whole” (Strauss & Corbin, 1998, p. 146). I examined my narrative descriptions and spreadsheets looking for a central category, focusing on reading quality, familiarity, responding behavior, and knowledge refined. I noticed patterns in the combined tables that corresponded to how knowledge was refined. I delved into the data again, resorting and organizing in order to detect relationships from a different perspective. During this process, knowledge refined kept surfacing as the central category that pulled the others together. The foundation for building the grounded theory was laid.

Categories were merged in charts for individual children as well as the entire sample. Identifying patterns of categories, emerging from and representing the data, enabled me to hypothesize about each individual child’s behavior and responses while reading the nonfiction book. Identifying patterns of categories, emerging from and representing the data of all five children, enabled me to build a grounded theory describing how early readers process information and comprehend concepts presented in nonfiction text.

Credibility

Codes of ethical standards or safeguards are typically included in qualitative research designs as a means of protecting the participants (Erlandson et al., 1993). The following safeguards (Erlandson et al., 1993) explain ways that participants were protected in this study.

1. Students were protected from harm. Selecting texts at instructional or independent levels enabled students to read the nonfiction books comfortably in an environment they were accustomed to. I met with the students the day before determining their text reading level and engaged in brief casual conversation before each reading response session began, so the children would feel comfortable and at ease during the sessions.
2. Privacy and confidentiality were assured by assigning each student a code name that was entered on the written documents. Children were identified by first name only during the taped reading response sessions. I used their names infrequently; the names were omitted on the written transcripts. Information gleaned from the recorded observations was not entered in the students' academic records. All records were stored in locked cabinets at my home and the parents were informed in writing about the measures taken to ensure confidentiality (see Appendix A).
3. Frequent open written and oral communication with all participants precluded deception. Meetings with parents or guardians, in person, were held to clarify written communication and to answer any questions they may have had. Parents were given a

handout reviewing the research procedures at this meeting (see Appendix B). I was available to parents through email and by phone to address any questions or concerns.

4. Parents were asked to give informed consent allowing their children to participate in the study. They were assured that participation was voluntary and that consent could be withdrawn at anytime without harming the study and without prejudice or penalty.

Peer debriefing helps build credibility by allowing a peer who is a professional outside the context and who has some general understanding of the study to analyze materials, test working hypotheses and emerging designs, and listen to the researcher's ideas and concerns. (Erlandson et al., 1993, p. 140)

I collaborated with a reading specialist and a doctoral student familiar with early literacy. It must be noted that the final interpretations are subjective; they stem from my worldview or perspective; another researcher with a different philosophy of reading and writing might very well arrive at different conclusions.

Different types of triangulation help to ensure the "verification and validation of qualitative analysis" (Patton, 2002, p. 556). The following kinds of triangulation suggested by Patton (2002) were used in this study:

1. *Triangulation of sources.* Data sources facilitated through observation include running records of children's oral reading behaviors, audio and video recordings and fieldnotes depicting conversational responses in interviews. Data collected from these sources were examined for confirmation or disconfirmation.

2. Analyst triangulation. A doctoral student acted as an interrater to build credibility. She reviewed processing and comprehending data and was consulted to substantiate technical and other word distinctions.

3. Theory/perspective triangulation. The review of the literature presents a variety of alternate views and contradictory findings regarding genre usage with beginning readers. Multiple perspectives were considered when the data were interpreted. They include theories and models postulated by David Rumelhart, Marie Clay, Kenneth Goodman, and Jerome Bruner.

Codes of ethical standards were followed to ensure credibility. Various methods of triangulation were used to analyze, categorize, and interpret the data presented in Chapter IV and Chapter V.

CHAPTER IV

FINDINGS

The purpose of this study was to discover how early readers process information and comprehend the content presented in nonfiction texts. Two questions guided the study:

1. How do early readers process information while reading nonfiction texts?
2. What do children's responses reveal about comprehending nonfiction texts?

Chapter IV presents results of the children's reading behaviors and conversational responses observed during the nonfiction reading response sessions. The chapter is organized by four main sections with exemplars describing: (a) processing behaviors while reading the nonfiction books, (b) use of nonfiction textual features, (c) comprehending nonfiction texts, (d) the processing and comprehending association, and (e) a chapter summary.

Processing Behaviors

Question 1- How do early readers process information while reading nonfiction texts?

The discussion of the findings focuses on the observed reading and overt responding behaviors exhibited by the children. Different behaviors and responses were observed as the children read texts with similar and varying degrees of difficulty. A

description of their reading behaviors is located in Chapter III. One child read a level 3, two children read text level 5, and two others read text level 6. The results depicted in the following section represent the reading behaviors of all five children. Descriptions of behaviors and responses made by Erica, Carley and Christopher, provide consistency for the reader. A description of these children's processing behaviors takes into account the diverse reading abilities exhibited by children in the two kindergarten classrooms.

Processing and Reading Quality

Processing refers to how children access, use and relate information from a variety of sources to understand the message represented by print. These information or knowledge sources include meaning, structure and visual information; visual information includes orthographic as well as phonological information (Clay, 2001; Rumelhart, 1994). Observable behaviors, recorded while children orally read nonfiction books, were used to infer the processing that resulted in the quality of their reading.

Terms used to represent the children's processing while reading are used in the following discussion. They are self-monitoring, searching, and self-correction.

Self-monitoring means checking on yourself when reading. A child who is reading accurately is self-monitoring. It may be observed when a child stops or give signs of uncertainty (Clay, 1993b). Searching is the gathering of information, used for the first attempt to read, or looking for more information with successive attempts and/or to self-correct (Clay, 1991; Schwartz, 1997). Self-correction refers to the rejection of an error response. Detailed descriptions are included in the Chapter III section *Processing Terms*.

Parallel processing signifies the simultaneous use of multiple sources of information; it is an indication that little attention is directed toward solving words (Clay, 2001; Rumelhart, 1994). The “simultaneous direction of attention” is characteristic of a system that economizes attention (N. Anderson, personal communication, March 30, 2004). Parallel processing is inferred when a child reads correctly without any overt attempts at problem solving. An error substitution made without observable attempts at problem solving, sounding like correct reading, indicates parallel processing as well. Successive processing is observed when a child attends to one piece of information at a time in a series of actions (Clay, 2001). The terms parallel and successive processing are used to describe how the children might have accessed information while reading nonfiction books. Parallel and successive processing are discussed in sections entitled *Parallel and Successive Processing* in Chapters II and III.

Reading quality is the result of reading or solving words. Reading quality refers to the attributes or characteristics that distinguish one result of processing from another. Accurate reading, words solved successfully, and self-corrections are observable behaviors. Substitutions or problem-solving attempts are observable behaviors. Meaningful approximation, approximation neglected meaning and less productive attempt are terms I created to reflect those behaviors. Those terms were labeled according to my beliefs and perspectives, filtered through my world view (Merriam, 1998). I believe that reading is a meaning driven process. The terms were shaped by my belief that the construction of meaning is essential to the reading process.

The following section describes the children's observable reading behaviors to solve words, in terms of the processing activities they represent. Reading behavior at the word level is described; all of the 754 words presented as text across the 15 individual reading response sessions are considered. The description is organized by parallel and successive processing; reading quality is presented within that framework. Detailed definitions of reading quality terms are located in Chapter III, *Reading Quality*. Appendix E includes a complete set of documents relating to Erica's session reading What Lays Eggs? (Gracestone, 1998).

Table 15

Processing and Reading Quality Behaviors: Word Level

	Parallel		Successive		Example
	Number	Percentage	Number	Percentage	
Accurate Reading	648	85.94%			Snails lay eggs Snails lay eggs
Solved			20	2.65%	Bats <u>s-sleep</u> all day Bats sleep all day
Self-correction			10	1.33%	<u>nails</u> SC claws
Meaningful Approximation	51	6.76%	4	0.53%	Bats eat <u>all</u> night Bats eat at night
Approximation Neglected Meaning	5	0.66%	1	0.13%	<u>d-on</u> <u>s-ond</u> sound
Less Productive Attempt			15	1.99%	<u>Af</u> <u>afric</u> <u>af-i-t-y-ter</u> After T
Total	704	93.37%	50	6.63%	
Total Number of Words		754			

Table 15 depicts the frequencies and percentages of reading quality in terms of the processing observed. Six hundred forty-eight of those words were read correctly without any overt attempts at problem solving, indicating parallel processing. Meaningful approximations are substitutions indicating that a child searched for meaning; the substitution "makes sense". Fifty-one meaningful approximations were made covertly, with one attempt, they sounded like correct reading. Substitutions that neglected meaning were made with one attempt five times. Overt problem solving attempts and errors were observed on the remaining 50 words. Of those 50 words, 30 were solved or self-corrected; when combined with accurate reading, 678 words were actually read correctly. On seven occasions children added words to the text; additions are not included in calculations involving total word count because they do not originate from the print.

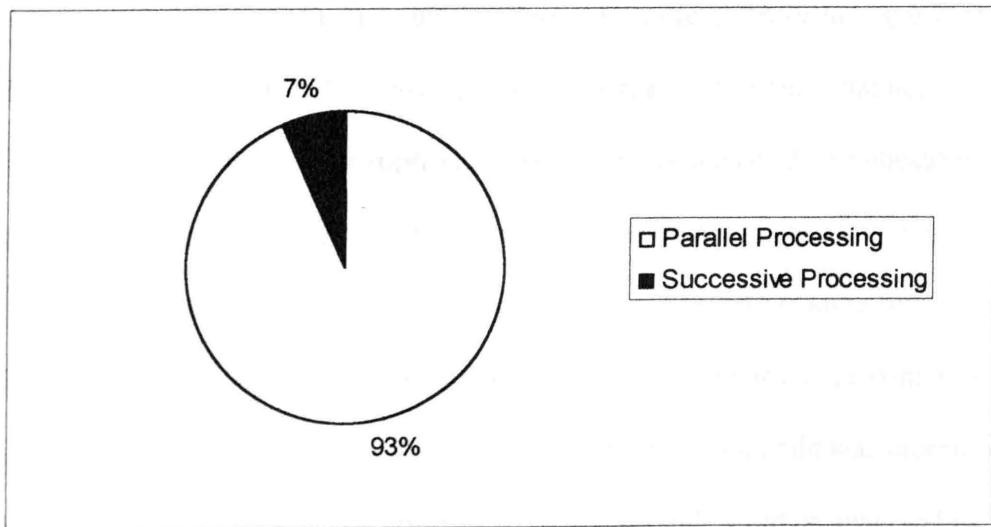


Figure 1. Parallel and Successive Processing.

Figure 1 represents the observed parallel and successive processing behaviors applied by the children. Ninety-three percent of the children's oral reading behaviors indicate parallel processing – little attention was directed to solving words. Successive processing was observed on 7% of the problem solving attempts.

Parallel Processing

Parallel processing was evident with accurate reading and meaningful approximations. Parallel processing comprised the majority of the children's oral reading.

Accurate reading

Accurate reading refers to efficient reading made without error; it corresponds with all the sources of information presented in the text (Clay, 1991). Attempts at problem solving are covert and not observable. Accurate reading tells us very little about how a child is processing information. The children read over 85% of the words correctly the first time across the 15 reading response sessions. Erica read *Snails lay eggs* correctly with no apparent difficulty. *Chickens lay eggs too*, was read in the same manner.

The majority of meaningful approximations made by the children indicate parallel processing; one attempt was made to substitute a word presented in the text. The error sounded like correct reading that is going along smoothly. Accurate reading reveals little about how a child is successively processing information. Meaningful approximations are errors and can be analyzed to reveal what sources of information a child was monitoring or searching for. Figure 2 depicts the observable behaviors that could be analyzed to discover how the children processed information when reading the nonfiction books. Additions were not included in the calculations represented below. Although the seven

additions were observed behaviors, they were not represented in the texts, therefore it is not helpful to analyze additions as a type of word error (Clay, 2002).

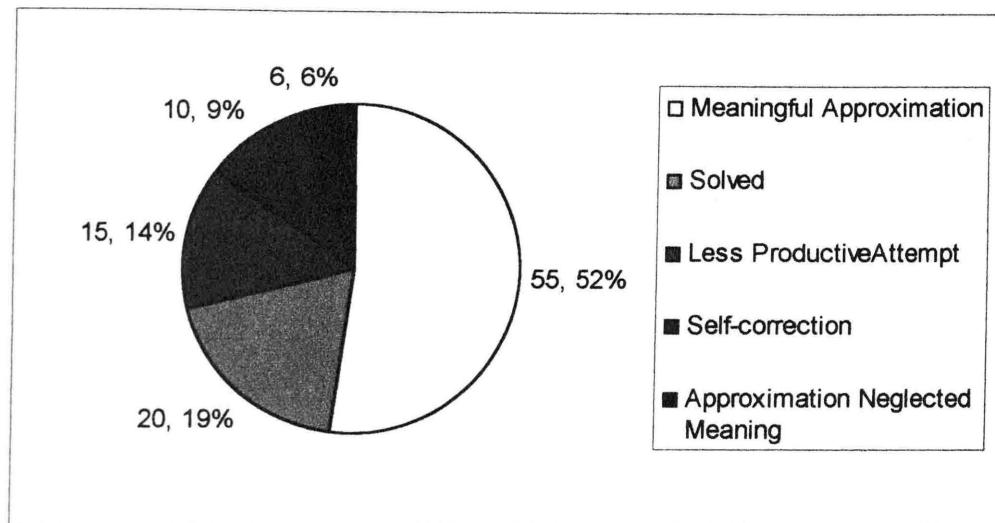


Figure 2. Reading Quality: All Words.

Parallel and successive processing behaviors observed during the 15 reading response sessions were combined, to represent the total occurrences of each of the 106 problem solving behaviors analyzed. Fifty-five meaningful approximations accounted for 52% of the attempts.

Meaningful approximation

Meaningful approximations refer to substitutions indicating that a child was searching for meaning. Over half of the total errors were substitutions that included meaning, along with structure and/or visual information. Substitutions that included meaning as the only source of information were less frequent.

Carley's substitution indicates a search for several sources of information.

Child: Bats eat all night.

Text: Bats eat at night.

Evidence of parallel processing was observed when Carley substituted *all/at*

She searched for meaning and structure. Visual information includes letter level

information – *a* begins *at* and *all*; she may have searched for letter features as well *l* and *t*

have similar shapes.

Erica searched for multiple sources of information:

Child: Mommy animals lay eggs.

Text: Many animals lay eggs.

Erica's substitution provides evidence that she was searching for different kinds

of information simultaneously, indicating parallel processing. She searched for meaning;

this book is about animals laying eggs and mommy animals lay eggs. The substitution is

syntactically correct. She searched for information at the word level, perhaps using letter

knowledge of *M* and *y* as well.

Carley integrated meaning and structure:

Child: Mosquitoes do not look over their eggs.

Text: Mosquitoes do not look after their eggs.

Parallel processing is evident in Carley's substitution. She searched for two

sources of information: *over their eggs* makes sense and it fits the grammatical structure

of the sentence. She did not appear to notice the visual discrepancy, perhaps because the

two sources she did use resulted in a good fit.

The majority of Christopher's errors in all three books indicate that he searched for more than one kind of information when substituting words. When reading Our Farm (Stango, 2001) Christopher accessed meaning and grammatical structure. He repeatedly substituted his own language while attending to one-to-one match. He did not appear to search for visual or phonological information at the feature, letter, letter cluster, or word levels.

Some examples include:

Child: We see pumpkins on the shelf.
Text: We see pumpkins on our farm.

Child: We see a cow on the hay.
Text: We see a cow on our farm.

He repeated these meaningful substitutions on subsequent pages.

Erica repeated meaningful substitutions while reading An Owl, That's Who! (Leigh, 2002)

Child: An owl who...
Text: An owl has...

Up to the point of error, her substitutions were meaningful and grammatically correct. She neglected to search for visual information at the letter or word level. She may have substituted *who* because that is a sound an owl makes; it is also included in the book's title.

The following example depicts a meaningful approximation. Erica searched for visual information in addition to meaning.

Child: Snails do not look after they eggs.
Text: Snails do not look after their eggs.

They/there is a meaningful substitution – the text refers to more than one snail. Erica searched for information at the word level perhaps using letter clusters. Erica's approximation was not grammatically correct; she neglected structure.

Christopher used meaning as the only source of information in a single attempt, indicating parallel processing.

Child: To is get my pajamas on.
Text: It is time for bed.

Successive Processing

Successive processing was observed when the children made multiple attempts to solve, self-correct or substitute words. The children engaged in successive processing to solve, self-correct or substitute 50 words. Successive processing was observed on approximately 7% of the words read.

Solved

A word was solved when a child made an observable attempt or attempts to work it out and did so successfully. Twenty of the successive attempts resulted in successful problem solving. Children used information in different ways and in different combinations to solve words as they read.

Searching for meaning by looking at the picture was the most frequent problem solving behavior observed. Carley solved the technical item *feathers* as she searched for

meaning with a quick look at the picture of a white and brown owl standing on a tree branch. All sources of information fit together and she went to the next page.

Child: An owl has (looked at the picture) feathers.
Text: An owl has feathers.

Erica solved *sleep* with a quick search for phonological information using the initial letter.

Child: Bats (hesitated) s - sleep all day.
Text: Bats sleep all day.

Erica searched for two sources of information to solve *fur*. She searched for phonological information at the initial letter level by articulating /f/. She made a subsequent search for meaning when she looked at the photograph of a furry bat.

Child: Bats have, (hesitated), f, (looked at picture) fur.
Text: Bats have fur.

Carley's verbal attempt to solve *make* suggests that she was successively searching for visual information, beginning with a sound analysis at the cluster level. Her next attempt, at the word level *make*, enabled her to solve *makes*.

Child: mu - make, makes

Self-correction

Self-corrections accounted for 10 of the successive processing behaviors. A self-correction was evident when a child read a word incorrectly, rejected the choice, and corrected the error.

Erica self-corrected her substitution *nails/claws*. Referring to the owl's claws on the page that stated, *An owl has sharp claws*.

Child: sharp nails

Text: sharp claws

Her initial substitution indicates that Erica was searching for meaning while using structure. She self-monitored, realizing something was wrong and conducted a successive search using visual information at the word level to self-correct, making all of the information fit.

Carley self-corrected two identical errors.

Child: Bats can l-leave in a tree.

Text: Bats can live in a tree.

Bats can leave in a cave.

Bats can live in a cave.

In the first instance Carley searched for information at the letter level then substituted *leave/live* searching for word level knowledge. Both substitutions indicate that she was using several sources of information, meaning, structure and visual information, up to the point of error. After reading on she noticed the discrepancy and quickly reread both pages to self-correct.

Child: Bats can live in a tree. Bats can live in a cave.

The self-corrections provide evidence that Carley searched for additional meaning - Bats *can live in a tree* makes more sense than *Bats can leave in a tree*.

Christopher self-corrected two errors when he began reading Our Farm (Stango, 2001).

Child: We like, we live on our, a farm.

Text: We live on a farm.

Christopher's substitution *like/live* indicates that he was initially searching for meaning, structure and visual information at the word level using initial clusters. He monitored the reading and conducted a subsequent search to self-correct *like*. When searching he may have used word level knowledge, and/or phonological information, *v* doesn't sound like *k*. Christopher may have searched for meaning and structure when substituting *our/a*. He monitored the error and self-corrected. The self-correction indicates a subsequent search for word level information – he probably knows how to read and write the word *a*.

Approximation neglected meaning

Six of the error approximations neglected meaning. These substitutions indicated that the child was not searching for meaning; there was little or no evidence of meaning being used.

Erica demonstrated difficulty reading *sound* and neglected meaning.

d-on sond
sound

Her successive attempts to solve *sound* indicate that she was searching for visual information. She used a sound analysis in her first attempt, perhaps noticing the most salient feature *d* of the word. She monitored that attempt and searched for additional information at the cluster level; her attempt resulted in a nonword that neglected meaning and structure.

Less productive attempts

A less productive attempt occurred when a child made successive attempts to solve a word and was subsequently given a told. Fifteen problem solving attempts were less productive.

Carley was told *after*, in the sentence *Most snakes look after their eggs* following several attempts to solve the word using a sound analysis.

Af, afric, af-i-t-y-ter

Attempts at solving *after* were less productive for Erica as well. She attempted the word using a sound analysis at the letter and cluster level.

Af, af-t-er, and the t , if you put the, er and the t-er-er-er

Erica verbalized her analysis as she successively searched for different kinds of phonological information.

Absence of meaning and language structure may have contributed to the difficulty both girls had solving these more complex high frequency words. The text reads: *Most snakes look after their eggs*. Children might say: *Most snakes take care of their eggs*.

The technical item *mosquitoes* was difficult for Carley and Erica, even though I referred to *mosquitoes* in the introduction.

Carley made several attempts to solve the word.

Child: monster, monster, monister, monstip
Text: mosquitoes

Her attempts indicate that she was searching letter level and letter cluster knowledge. She may very well have been using her semantic level knowledge – monsters might lay eggs, yet that response is not meaningful in this particular text. Her attempts resulted in a told.

Erica's attempts differed from Carley's. She was told the word after successive attempts searching for different kinds of information.

Child: mouth m-o, I wonder what that's called	
Text: mosquitoes	Told

Her first attempt indicates that Erica was searching information at the word level. She went to letter level knowledge in her second attempt. She may have been searching for meaning, by linking to personal knowledge when she stated, *I wonder what that's called*. After she was told the word Erica responded, "Mosquitoes I know what they're called I kind of forgot." Mosquitoes may very well have been known to her through previous experiences.

Additions

Only seven additions to the original text were made by the children in the study. Additions were considered as errors and included in the accuracy calculations on the running record forms; they comprised seven solving attempts. However, they were not analyzed regarding sources of information (Clay, 2002).

Examples of Christopher's additions are:

Child: We put on our (looked at picture) snow hats.	
Text: We put on our	hats.

Child: Now (looked at picture) I am ready to wash my face.
Text: I put on my pajamas.

Christopher did not appear to notice a discrepancy in either instance.

Summary

The simultaneous use of multiple sources of information indicates parallel processing; little attention is directed toward solving words. Parallel processing, using several sources of information, is assumed when reading is accurate. A large majority of children's reading was accurate, indicating parallel processing. Analysis of meaningful approximation errors revealed that the children searched for more than one source of information to solve those words. Correct reading resulted after successive attempts at solving and self-correcting. Less productive attempts and substitutions that neglected meaning were observed the fewest number of times.

Children's Use of Textual Features to Facilitate Processing

Recorded observations indicate that the children used specific textual features presented in the books as they were reading. Ways the children used types of words and pictures in the reading process are discussed in the following section.

Type of Word

The category type of word was used to designate the distinction between technical terms and other words. Technical terms are lexical items presented in a nonfiction book (Pappas, 1993). Technical terms or vocabulary words correspond to the specific content presented in a book. Other words consist of all other words included in the text.

Table 16

Reading Quality: Technical Terms and Other Words

	Technical Terms		Other Words	
	Number	Percentage	Number	Percentage
Accurate	162	80%	486	88%
Solved	11	5%	9	2%
Self-correction	4	3%	6	1%
Meaningful Approximation	19	9%	36	7%
Approximation Neglected Meaning	2	1%	4	1%
Less Productive Attempt	5	2%	10	2%
Total	203	100%	551	100%
Total Number of Words	754			

Table 16 represents reading quality percentages of technical terms and other words read by all five children in the nonfiction books. Reading quality refers to the distinguishing attributes of solving attempts; it was nearly the same for both types of words. The children read other words accurately on the first attempt 88% of the time; technical terms were read correctly 80% of the time. Approximations neglecting meaning and less productive attempts that resulted in tolds, were 1% and 2% respectively. Additions were not included in the technical term and other word calculations. The

calculations are based on the total number of words found in the books; additions are words that were not presented in print.

Technical Terms

A description of the reading behaviors used to solve technical items (vocabulary words) is presented in the discussion below. The section is organized by *reading quality*.

Accurate reading

Many technical items were read correctly the first time with no observable attempts at problem solving. Eighty percent of the technical terms presented in the texts were read accurately with no apparent difficulty.

Christopher read the words *jackets, hats, goggles* and *boots* correctly with no overt attempts at problem solving in We Ski (Gracestone, 1997).

It appeared that Carley and Erica had little difficulty reading animals that can lay eggs: *snakes, fish, snails* and *chickens*.

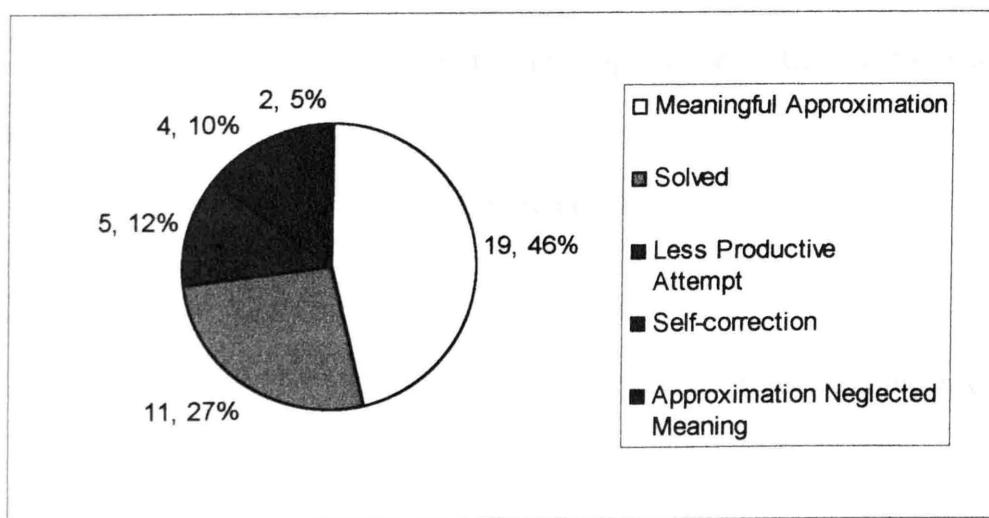


Figure 3. Reading Quality: Technical Terms.

Accurate reading reveals little about how a child is processing information; it is assumed all is going well with the reading. Analysis of overt solving behaviors and errors provides insights as to how children process information when reading. Figure 3 depicts the 41 observable solving behaviors that were analyzed to discover how children processed information to read technical words. Almost half of the technical item substitutions were meaningful. The children solved successfully or self-corrected approximately one-third of their errors. Eighty-three percent of the observable processing behaviors, regarding technical items, resulted in efficient and meaningful reading.

Solved

A word was solved when a child made an attempt followed by correct reading. Eleven technical terms were solved correctly after one or more attempts.

Carley solved feathers as she searched for meaning by looking at the picture.

Child: An owl has (looked at picture) feathers.
Text: An owl has feathers.

Erica solved *fur* searching both phonological information and the photograph successively.

Child: Bats have /f/, (looked at picture), fur.
Text: Bats have fur.

Self-correction

Children rejected substitutions to self-correct four technical word errors.

Erica self-corrected *nails/claws*.

Child: Sharp nails
Text: Sharp claws

Her initial substitution was meaningful, *claws* could possibly be thought of as *nails*, and grammatical. She monitored her attempt and searched the beginning of the word for visual information at the letter level. She may have searched for additional meaning as well; *claws* makes more sense than *nails*.

Meaningful approximation

Meaningful approximations indicate that children searched for meaning.

They accounted for 19 of 26 error substitutions.

Carley's substitution was meaningful. She searched for visual information at the cluster level, *an*, as well.

Child: May o- ants lay eggs.
Text: Many animals lay eggs.

Christopher made meaningful substitutions while reading the captions that accompanied the glossary pictures in Time for Bed. He neglected to search for visual information at the letter and word level.

Child: bed teeth
Text: sleep brush

Christopher repeated meaningful substitutions while reading Our Farm. The substitutions indicate that he simultaneously searched for meaning and structure; he neglected to search for visual information. Christopher didn't appear to notice the discrepancies as he continued reading.

Child: We see pumpkins on the shelf.
Text: We see pumpkins on our farm.

Child: We see a cow on the hay.
Text: We see a cow on our farm.

Child: We see chickens on the log.
Text: We see chickens on our farm.

Child: We see a tractor on the grass.
Text: We see a tractor on our farm.

Farm is considered a vocabulary word or technical item, yet his substitutions were meaningful based on the photographs.

Approximation neglected meaning

Approximations neglecting meaning indicate that meaning was lost. These errors were observed the least number of times; only twice with technical items.

Joseph was the only child to neglect meaning when substituting technical items.

His substitution *sike/seek* is an example.

Child: We can play here and sike.
Text: We can play hide and seek.

Joseph was searching for visual information at the letter level. *Sike* and *seek* both begin with the same sound /s/ and end with the same sound /k/.

Less productive approximation

Occasionally the children's attempts resulted in a told. The children were given five technical word tolds.

Erica attempted *mosquitoes* by successively searching for knowledge at the word and letter levels. Her comment after being told the word, "I know what they're called I

kind of forgot," indicates that she may have searched her personal knowledge by trying to recall the insect's name.

Child: mouth, m-o, I wonder what that's called,
Text: mosquitoes Told

Carley attempted mosquitoes searching for visual information by looking at individual letters and letter clusters with successive attempts.

Other Words

A description of the reading behaviors used to solve other words is presented in the discussion below. The section is organized by reading quality.

Accurate reading

A total of 551 other words were read by the children across the 15 sessions. (see Table 16) Eighty-eight percent of those words were read correctly the first time; it is assumed that all the sources of information fit.

Erica read the other words *can*, *live*, *in*, *a* accurately:

Bats can live in a cave.

We, put, on, our are other words that were read correctly by Christopher.

We put on our goggles.

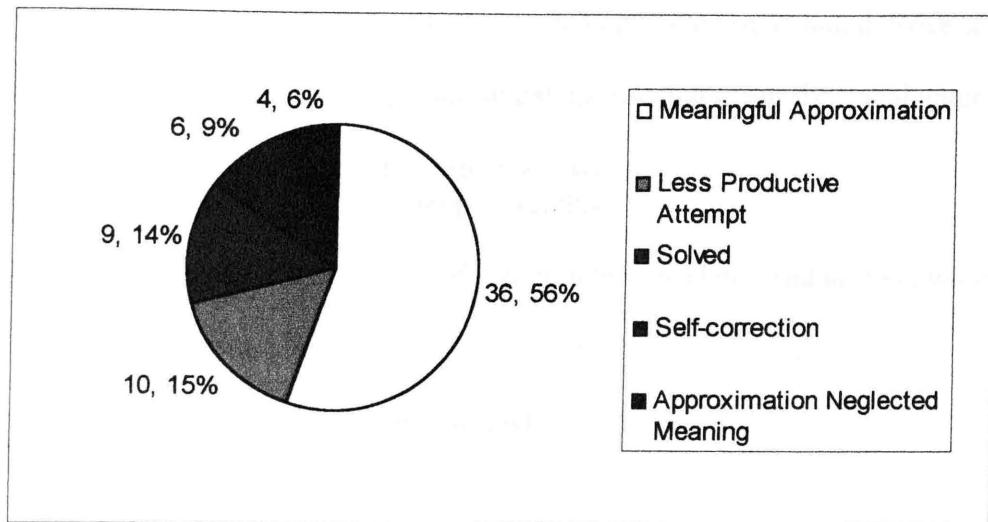


Figure 4. Reading Quality: Other Words.

Accurate reading reveals little about how a child is successively processing information; it is assumed all is going well with the reading. Analysis of overt solving behaviors and errors provides insights as to how children process information when reading. Figure 4 depicts the 65 observable solving behaviors that were analyzed to discover how children processed information to read the *other* words. Over half, 56%, of their approximations were meaningful. Twenty-three percent of the other words were solved accurately or self-corrected. Efficient, meaningful reading of other words was observed 80% of the time.

Solved

A word was solved when a child made an observable attempt or attempts to figure it out and read the word correctly. Children solved nine other words.

Children solved other words by articulating the initial sound. Erica solved *sleep* with a quick search for phonological information using the initial letter.

Child: Bats (hesitated) s - sleep all day.

Text: Bats sleep all day.

Pictures were a source of information that children used to solve words. Carley looked at the picture, searching for meaning before reading *big*.

Child: An owl has (looked at picture) big eyes.

Text: An owl has big eyes.

Self-correction

The children self-corrected error substitutions with other words six times.

Christopher self-corrected two meaningful “other word” errors while reading Our Farm (Stango, 2001).

Child: We like, we live on our, a farm.

Text: We live on a farm.

He initially searched for meaning, structure and visual information at the word level, using initial clusters. Christopher monitored his reading when he noticed *like/live* didn't correspond visually and conducted another search to self-correct *like*.

His substitution *our/a* indicates that he was searching for meaning and structure.

Christopher made a subsequent search for word level information and self-corrected the error.

Carley self-corrected an error after reading on. She initially searched for meaning, structure, and visual information at the word and letter levels. She monitored her error and searched for additional meaning to self-correct the other word *live*.

Child: Bats can l-leave in a tree. Bats can leave in a cave.
Text: Bats can live in a tree. Bats can live in a cave.

Child: Bats can live in a tree. Bats can live in a cave.

Meaningful approximation

A meaningful approximation is a substitution that indicates a child was searching for meaning. The child may have searched for structure and/or visual information as well. Other word meaningful approximations totaled 36.

Erica's substitution is meaningful and grammatical up to the point of error.

Child: An owl, an owl who
Text: An owl has

She repeated this substitution throughout the reading.

Christopher substituted "other" words (as well as technical terms) when he repeated substitutions on several pages.

Child: We see pumpkins on the shelf.
Text: We see pumpkins on our farm.

Child: We see a cow on the hay.
Text: We see a cow on our farm.

His substitutions *the/our* are meaningful and grammatical. Christopher neglected to search for visual information, resulting in several errors.

Approximation neglected meaning

Meaning was lost when an approximation neglected meaning. On four occasions the children used structure and/or visual information, resulting in nonword substitutions of other words that were not meaningful.

Carley searched for initial and final visual information at the letter cluster level, *mo*, and the letter level *t* respectively.

Child: Mont
Text: Most

Erica attempted a sound analysis with successive attempts using visual information at the letter and cluster level. The error was a nonword; meaning and structure were neglected.

Child: d-ond, son
Text: sound

Less productive approximation

Tolds resulted when children attempted to solve words using one source of information. Often they would use a sound analysis and/or make attempts at the cluster or word level. Tolds occurred 10 times with other words.

Carley attempted *after* searching for phonological information at the letter and letter cluster levels in successive attempts. When the result was not productive she was given a told.

af, afric, af-it-y-er

Erica attempted to solve *night* searching phonological information at the letter, cluster and word levels. After a hesitation she was given a told.

Bats eat at ni-g-h-t; hot

Erica attempted *know* using what was meaningful to her and initial letter level knowledge.

Child: kangaroos
Text: know

After being told *know*, she responded “that looks like a kangaroo owl to me.”

Pictures in Nonfiction Books

The children used the pictures as a source of support to facilitate processing, usually resulting in accurate and meaningful reading. However, at times their use of the pictures resulted in error. The following discussion relates how the pictures were used to support meaningful reading and how they may have caused confusion.

Pictures Used to Facilitate Processing

A review of the videos revealed that the children often glanced at the pictures during page turns before or after reading; it appeared to be automatic. These observations were noted, but not analyzed.

Carley glanced at the picture as she turned to the first page of Bats, Bats, Bats (Olearczyk, 2001), perhaps initiating a quick search for meaning before reading.

(glanced at picture) Bats have wings. Bats can fly.

Later in the book, she glanced at the picture after reading, while turning the page, possibly to confirm what she had just read.

Bats sleep all day. (glanced at picture)

The same behaviors were observed when Erica was reading What Lays Eggs? (Grestone, 1998). She may have searched the pictures for confirmation after reading.

Mommy animals lay eggs. (glanced at picture)

A quick glance at the picture indicates she may have been searching for meaning before reading.

(glanced at picture) Fish lay eggs.

All of the children appeared to use the pictures as a source of information to help them solve unknown words when reading.

Carley searched for meaning by looking at the picture.

Child: An owl has, (looked at picture), sharp claws.
Text: An owl has sharp claws.

Erica used phonological information and the photograph to solve *fur*.

Child: Bats have, f - (looked at picture), fur.
Text: Bats have fur.

Pictures Cause Confusion

Christopher's use of the illustrations may have caused him to make several meaningful approximations as he read Our Farm (Stango, 2001).

Child: We see pumpkins (looked at the picture) on the shelf.
Text: We see pumpkins on our farm.

Christopher searched the picture for meaning. Pumpkins were on a shelf in the picture. His approximations on the following pages were similar; he searched the picture for meaning and substituted what the photograph depicted, rather than what the print said.

Summary

Reading quality regarding technical terms and other words was similar. Children read a large majority of both types of words accurately with little apparent difficulty. Little attention was directed towards problem solving. Several attempts were solved accurately and self-corrected; adding to the total number of words read correctly. A higher percentage of accurate reading was observed with other words. Less productive attempts and substitutions that neglected meaning were observed the fewest number of times.

Observations reveal that the children used the pictures in the nonfiction books as sources of information to facilitate processing. The children's use of the pictures usually resulted in accurate, meaningful reading. At times, however, they were unable to access those sources effectively resulting in errors that were not always meaningful.

Comprehending Nonfiction Texts: Meaning Construction

Question 2 – What do children's responses reveal about comprehending nonfiction texts?

Comprehending is a constructive process that is dependent on what the reader knows before reading. It occurs during and after reading. After reading, comprehension may change (Goodman, 1994) as meaning is reconstructed (Ruddell & Unrau, 1994). The children's responses before and after reading were examined to discover how

comprehending may have changed after reading the nonfiction books. Responses from all five children are included in the results.

Familiarity

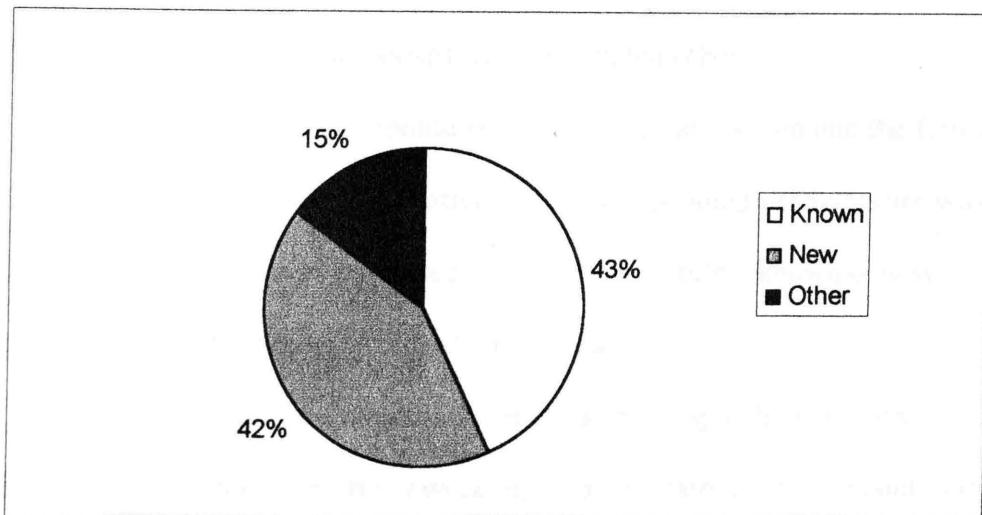


Figure 5. Familiarity: Message Units.

Records of conversations were examined to determine how the five children's responses before reading related to responses made after reading. The responses were organized by meaningful units that contained a single thought, idea, or detail. Two broad categories depicting familiarity emerged: known knowledge and new knowledge. Known knowledge refers to topics mentioned in the introduction or preview by a child or the introduction by the researcher. Forty-three percent of the children's responses after reading related to known knowledge. New knowledge refers topics or details that were not mentioned before reading. New knowledge does not necessarily reflect new learning; it does indicate that the child was attending to the message in the text because the topic

was not mentioned prior to reading. The children related new information 42% of the time. A smaller category, other, comprised three types of responses. Misunderstandings occurred when a child appeared to misinterpret a topic presented in the book. General comments lacked specificity and comments beyond text did not relate at all to a book's content. Fifteen percent of the responses were designated other.

Oral reading behavior and spontaneous comments are woven into the following discussion describing responses made after reading. Responding behaviors are what a child did with a book; knowledge refined refers to how a child's known or new knowledge was verified, changed, shifted, or expanded.

The following discussion describes the children's responding behaviors and knowledge refinements within a framework organized by familiarity. For continuity, responses made by Erica, Carley, and Christopher are described.

Known Knowledge

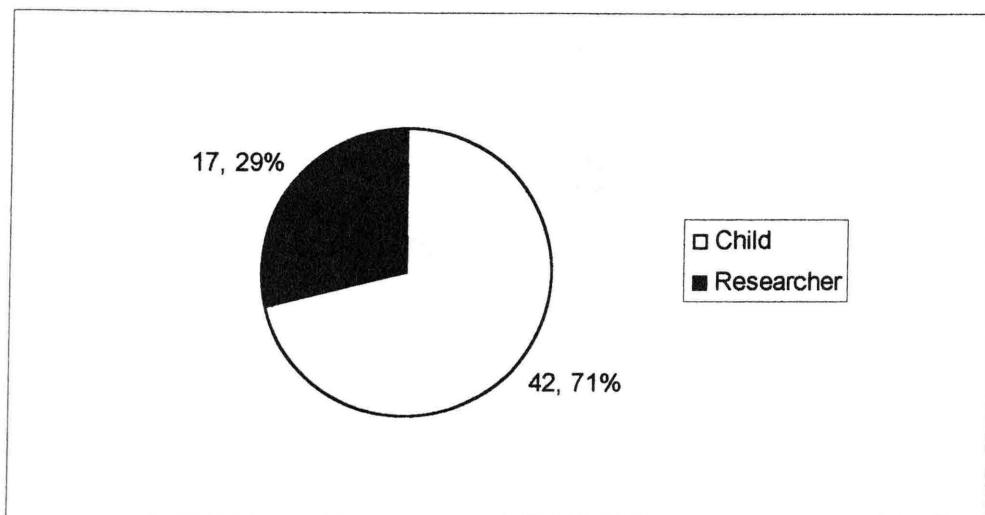


Figure 6. Origin of Knowledge.

Known knowledge refers to information related either by the child or the researcher during the book introduction or related by the child while previewing the book before reading. Figure 6 represents who originated the response. Forty-two of the after reading responses related to information mentioned by the child; 17 were introduced by the researcher.

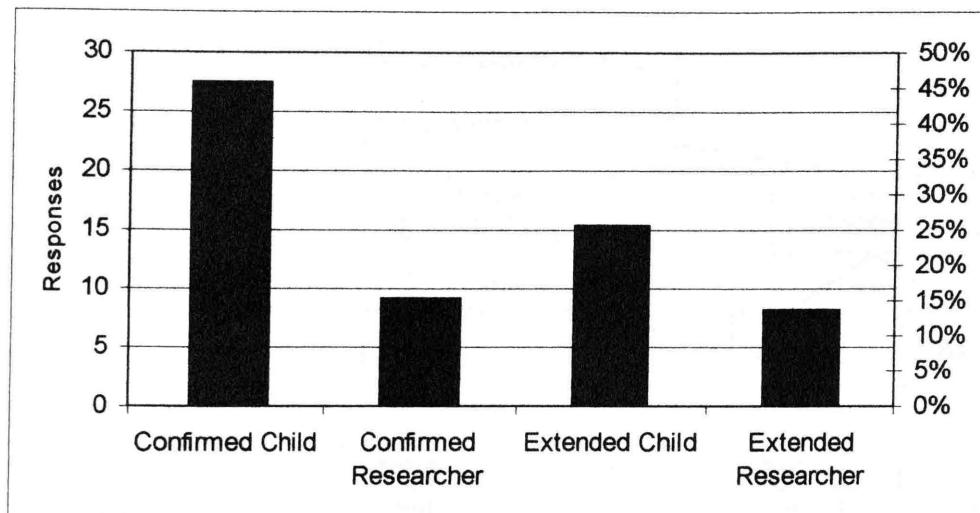


Figure 7. Known Knowledge Refined.

The children related information or knowledge discussed in the introduction or preview in two different ways. Figure 7 represents how the knowledge was refined.

1. The children confirmed what was known by restating a topic that had previously been related without elaboration or adding details. The children confirmed topics that originated from themselves 46% of the time. Children confirmed topics introduced by the researcher 15% of the time.

2. The children extended known knowledge by adding details to what was discussed before a book was read. Twenty-five percent of the children's responses extended knowledge that they had related. Fourteen percent of the extensions were from topics introduced by me.

The topics or information discussed by the children were presented specifically in the text or were related to the book's topic.

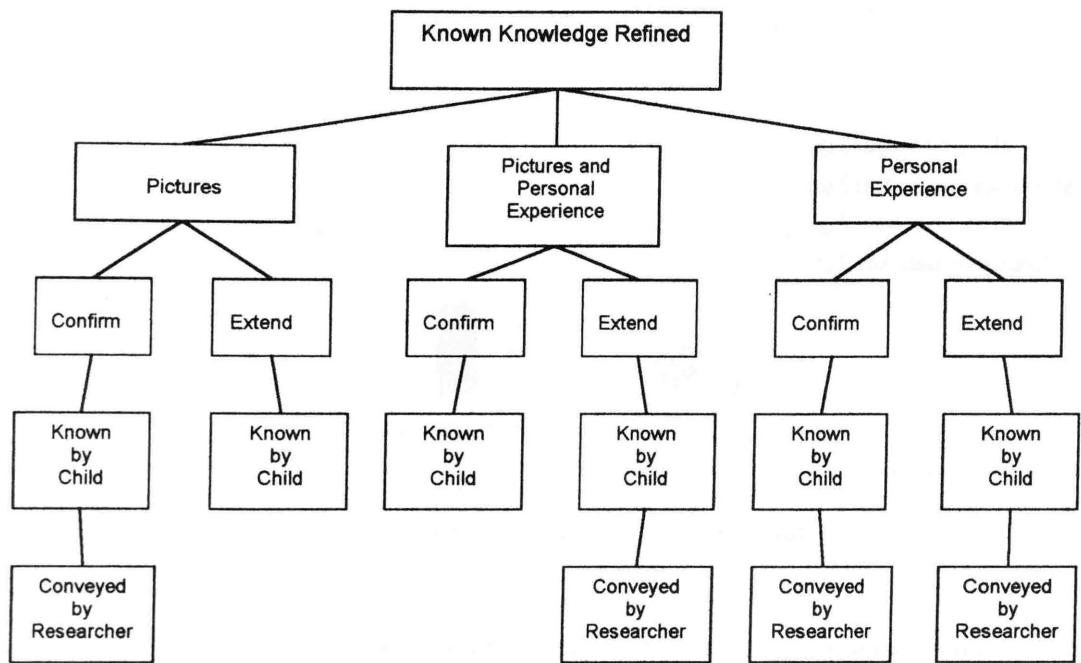


Figure 8. Organizational Scheme: Known Knowledge.

Figure 8 represents the organization for the following section that describes how children refined known knowledge. The section is organized by responding behaviors; how the knowledge was refined lies within that framework.

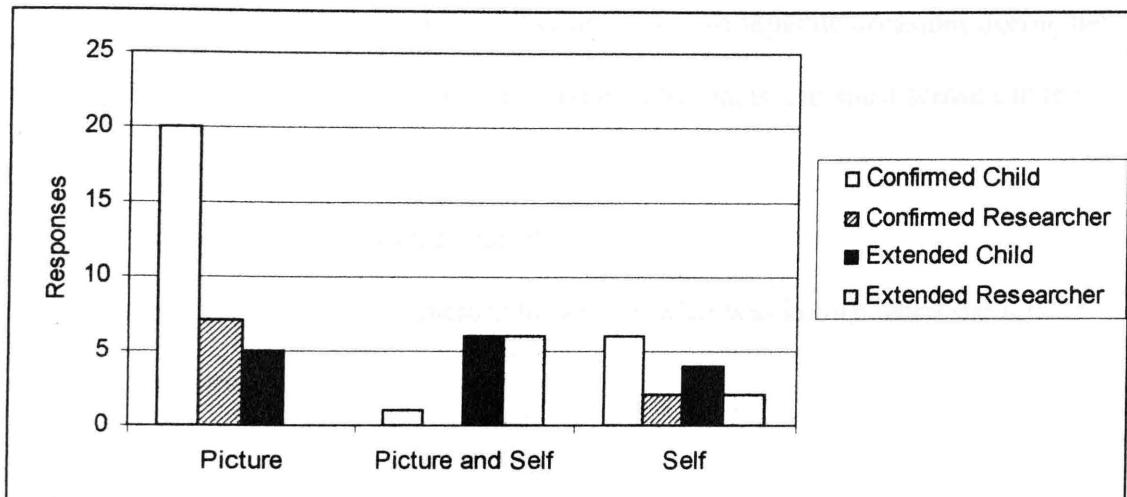


Figure 9. Responding Behaviors and Known Knowledge Refined.

After reading, the five children confirmed and extended information that had been previously related in three ways. They referred to the pictures, referred to the pictures and related personal experience or related personal experience with the book closed. Personal experience is designated by the term self in tables and figures. Figure 9 represents how the children responded regarding known knowledge. The number of occurrences of each behavior is depicted, with the corresponding originator (child or researcher) of the topic.

Pictures facilitate confirmation of knowledge known by the child

Children confirmed previous responses by restating or verifying what had been discussed before reading a nonfiction book. They used the pictures to confirm known information they had related before reading 20 times after reading the nonfiction books.

Carley talked about an owl's ability to fly on two separate occasions during her conversation after reading. The text was used to verify facts that she discussed in the introduction:

"... they have wings so they can fly".

After reading she pointed to the picture to confirm what was known when she related:

"I think owls like to fly."

"I think that owls, um, need to fly."

She offered no additional information to her statement made in the introduction while looking and pointing to the picture.

Erica confirmed facts about animals that can lay eggs as she turned the pages. She flipped through the pages during the preview relating:

"... many different animals fishes or sharks or snails any kind of, any kind of animals, animals can lay eggs... chickens can I think that's all. "

She recalled the exact text as she pointed to the photographs to support what she knew about animals that can lay eggs.

"Frogs lay eggs... snakes lay eggs, fish lay eggs, snails lay eggs, mosquitoes lay eggs, chickens lay eggs."

During the introduction of Our Farm (Stango, 2001), I asked Christopher, "What animals might live on a farm?" He replied, "Chickens, rooster ... dogs, cows, pigs." While previewing the book he said, "Oh, and pumpkins," when he saw the picture of the pumpkins. Christopher confirmed known knowledge about things we see on a farm when he pointed to the pictures of pumpkins, chickens and roosters and labeled them.

accordingly. After reading he turned to the respective pages and stated, “Pumpkins, and chickens and rooster. I see a rooster.” He added no other details to the comments he had made during the introduction and preview.

Pictures facilitate confirmation of information conveyed by the researcher

Pictures were used to confirm topics introduced by the researcher on seven occasions. Christopher confirmed information introduced by me before he read Our Farm (Stango, 2001). I said, “Something I know about a farm is that chickens live on a farm.” After reading he looked and pointed to the picture of the chickens and said, “chickens.”

After reading What Lays Eggs? (Grestone, 1998) Erica noticed, “I didn’t know that these were mosquitoes. I know what they are called, I just kind of forgot it.” I introduced the fact that mosquitoes lay eggs; Erica confirmed it without adding any other details.

Pictures facilitate extension of knowledge known by the child

Knowledge was refined by elaborating or adding details to what had been mentioned before reading a particular book. The children used the pictures five times to extend what they discussed before reading; the pictures were not used to extend topics introduced by me.

Carley extended what she knew about bats hanging upside down. Before reading Bats, Bats, Bats (Olearczyk, 2001), Carley noted that, “Bats can hang upside down on trees...” After reading she referred to the photograph with two bats hanging upside down on a tree branch and commented, “I liked this part because the bat is hanging upside down, and I hang upside down on the couch.” She extended what she had mentioned in

the introduction about bats hanging upside down to her personal experience of hanging upside down on the couch.

Erica extended known details when referring to the pictures. Before reading, Erica related that snails can lay eggs. She extended this knowledge as she pointed to the photograph of snail eggs and described, “They can lay white eggs or shiny bright eggs, like those.”

Pictures and personal experience facilitate confirmation of knowledge known by the child

Erica was the only child to confirm what she had related before reading using both the picture and personal experience. She confirmed knowledge about a topic that was related to bats, but not contained in the book. Before reading Bats, Bats, Bats (Olearczyk, 2001) she noted, “That smells like a vampire bat, too.” After reading, she pointed to the cover and stated, “Even bats on DVD’s can turn into vampires.” Vampire bats, known from her personal experience watching a DVD, are related to the topic *bats*, but were not presented in this particular book.

Topics introduced by me were not extended with the pictures and personal experience by any of the children.

Pictures and personal experience facilitate extension of knowledge known by the child

The children used the pictures and related personal experience to extend knowledge originating with them. This behavior was observed six times.

Before reading Bats, Bats, Bats (Olearczyk, 2001), Erica commented that bats are, “awaking in the night.” The contents are related, but not presented in the book. She extended this knowledge again later in the conversation by connecting to people’s sleeping habits as well, “... the caves are so dark that people are sleeping and bats are awake in caves.”

Pictures and personal experience facilitate extension of information conveyed by the researcher

The children extended topics introduced by me. They referred to the pictures while relating personal experiences six times.

Before Christopher read We Ski (Grestone, 1997), I mentioned that we need to put on goggles to ski. Christopher commented about the children’s goggles, “They look like aliens when they put on their goggles.” He extended what I had said to his personal knowledge about aliens.

Carley extended my comment that “...an owl has feathers.” She pointed to the owl, “I liked this part cuz it has pretty feathers that are like my shirt.” She used the picture while relating knowledge about herself – her pretty shirt.

Personal experience facilitates confirmation of knowledge known by the child

On six occasions children related personal experiences without referencing the book. This knowledge or information was mentioned by children before reading. The following example depicts how Erica confirmed information that is related to the content presented in Bats, Bats, Bats (Olearczyk, 2001). Erica confirmed what she knew about bats’ sleeping habits. Before reading she noted that bats are “awaking in the night.” Her

after reading statement that "...bats are supposed to be awake at night," falls under the heading of *self*. She confirmed what she had previously said without additional details.

Personal experience facilitates confirmation of information conveyed by the researcher

The children used personal experiences to confirm what I had said on two occasions. Before reading Time for Bed (Nowak, 2002), I mentioned that I read before going to bed. Christopher confirmed what I had said without using the book, "And let's see here I read a story."

Personal experience facilitates extension of knowledge known by the child

Children extended known knowledge by relating to themselves. Children used the book and related to personal experience to extend known knowledge on three occasions.

What Lays Eggs? (Grimestone, 1998) remained closed as Erica extended known knowledge. During the preview Erica noted that fish can lay eggs. After reading she elaborated, "And also that fishes can lay eggs from many different ponds or, or different lakes."

Personal experience facilitates extension of information conveyed by the researcher

Children related information introduced by me to their personal lives twice. The book remained closed while they responded.

During the introduction to Bats, Bats, Bats (Olearczyk, 2001), I stated to Erica, "some things that I know is that bats have fur." After reading she commented on the bats' fur without referring to the book. She likened the bats' fur to the furry material inside of

jackets. "I like their fur because they're so soft like jackets and they have like jackets they have like fur inside of jackets." Erica constructed meaning by extending what was presented in the text. She connected the fact that bats have fur to the furry material that lines jackets.

New Knowledge

New knowledge refers to a topic or information that was not discussed before a child read the book. The response may reflect new learning or it could possibly be a confirmation or extension of previously known knowledge; I would have no way of knowing that for sure. Even if a topic was previously known (and many probably were) it is an indication that the child was attending to the message presented in the text. Two broad categories describe the ways that children related new knowledge. Children designated knowledge, by stating specifically what was in the book; a topic was mentioned without adding details. New knowledge was extended by adding details and elaborating.

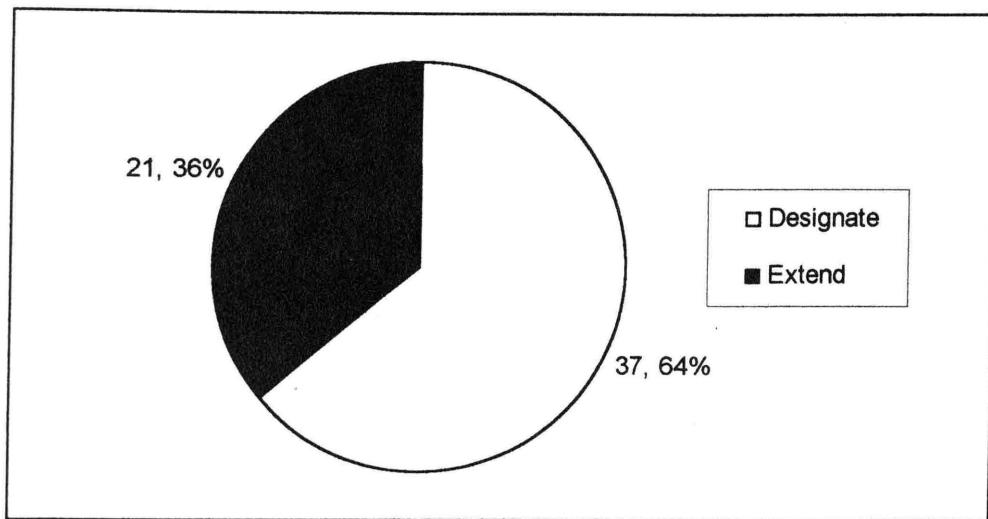


Figure 10. New Knowledge Refined.

Figure 10 represents the two ways the children related new knowledge. Sixty-four percent of new knowledge was designated. Thirty-six percent of the responses extended new knowledge.

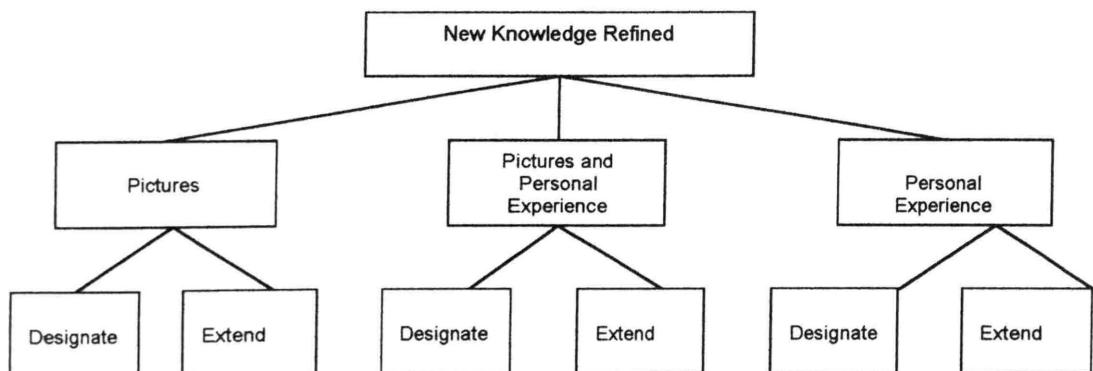


Figure 11. Organizational Scheme: New Knowledge.

Figure 11 represents the organization for the following section that describes how children refined new knowledge. The section is organized by responding behaviors; how the knowledge was refined lies within that framework.

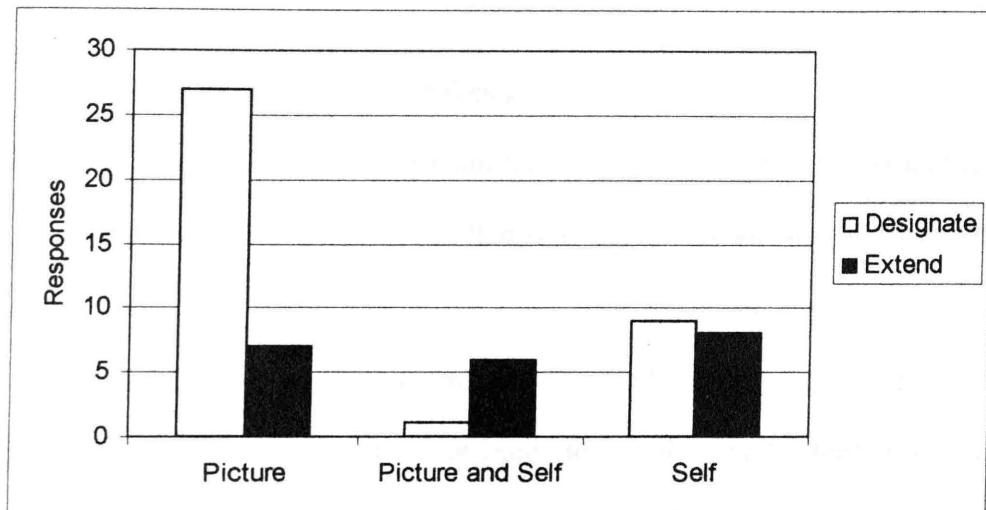


Figure 12. Responding Behaviors and New Knowledge Refined.

Observations revealed that the children referred to the picture, related to personal experience while referring to the pictures or related to personal experience with the book closed. Figure 12 represents how the children designated and extended new knowledge after reading. The number of occurrences for each response is depicted. The following discussion describes the children's responses regarding new information.

Pictures facilitate designation of new knowledge

Children designated new information by pointing to the picture as they spoke, without adding details. This behavior was observed most frequently; 27 times.

Carley demonstrated awareness of new content by pointing to the pictures as she spoke.

"Um, I never knew that snakes laid eggs."

She referred to *fish* and *snails* in a similar manner. Carley may have been learning something new about some animals that were previously known - *snakes, fish and snails* lay eggs.

Erica designated new information after reading What Lays Eggs? (Gracestone, 1998). *Crabs* were included in her response to my question, "Is there anything else that was new to you?" She designated, "crabs" while pointing to the insert of a crab. The text did not state that crabs lay eggs; Erica was making an inference from the photograph.

Pictures facilitate extension of new knowledge

The children also used the pictures to extend new knowledge. They referred to the picture and elaborated by providing details seven times.

Carley used the pictures to extend new understanding. She traced the outline of snail eggs while stating, "Um, these are eggs but they're really different. They're kind of small. They're like this small like that – like a little circle."

Pictures and personal experience facilitate designation of new knowledge

Children responded by pointing to the picture and relating personal experiences. This behavior occurred once. Christopher was the only child to designate new

information using the picture. After reading, I asked, “was anything new to you when you read Our Farm (Stango, 2001)?” He pointed to the photograph of the farmer on his tractor and commented, “the tractor mowing.”

Pictures and personal experience facilitate extension of new knowledge

New knowledge was extended when children used the pictures and related personal experiences. The behavior was observed six times.

Erica extended a newly mentioned detail while pointing to the photograph: “Owls have sharp claws that can like, that like, can scrape people that comes near those kinds of owls.” She extended the detail, sharp claws, by relating what she knew about sharp objects.

Before reading Bats, Bats, Bats (Olearczyk, 2001), Erica commented that bats are, “awaking in the night.” She extended this knowledge, explaining why they sleep in the daytime, “the sun shines on them and will make them get hot.” Erica talked about bats’ fur earlier; it is possible that she was relating the idea that the bats’ fur would make them warm in the daytime. The contents are related, but not presented in the book. She elaborated about bats’ sleeping habits again in the conversation, “... the caves are so dark that people are sleeping and bats are awake in caves.”

Personal experience facilitates designation of new knowledge

Sometimes the children responded with the book closed. New information was designated by relating to personal experience without the book nine times.

Christopher designated new information after reading Time for Bed (Nowak, 2002). “I go to sleep at least, wash my face and that’s all.” Both items were included in

the book. Christopher most likely knew that he goes to sleep and puts on his pajamas, but it was not related before reading.

Erica designated new information, “And some owls can go, whoo, whoo, whoo,” after reading An Owl, That’s Who! (Leigh, 2002). The book did not specifically state that owls can go *wwoo*, but did say, *Do you know what sound an owl makes?* The fact that owls make a hooting sound may very well have been known to Erica before reading, but she did not mention that fact.

Personal experience facilitates extension of new knowledge

The children extended new knowledge by adding details to a topic that was not mentioned before reading. This response occurred eight times.

Christopher extended a new topic related to skiing, ski poles using his personal knowledge about swords. With the book closed he remarked, “On guard, they could have a sword fight with them too! Ching, din, dun, pow! That would hurt!”

Carley extended new information about bats growing, “I think that mommy bats like to grow baby bats. And they grow over and over and over and I do not know how they can stop.” The book was closed.

Other

The category other includes misunderstandings about a specific detail presented in a book, general comments about a book’s topic or remarks that had no relationship to a book’s content at all.

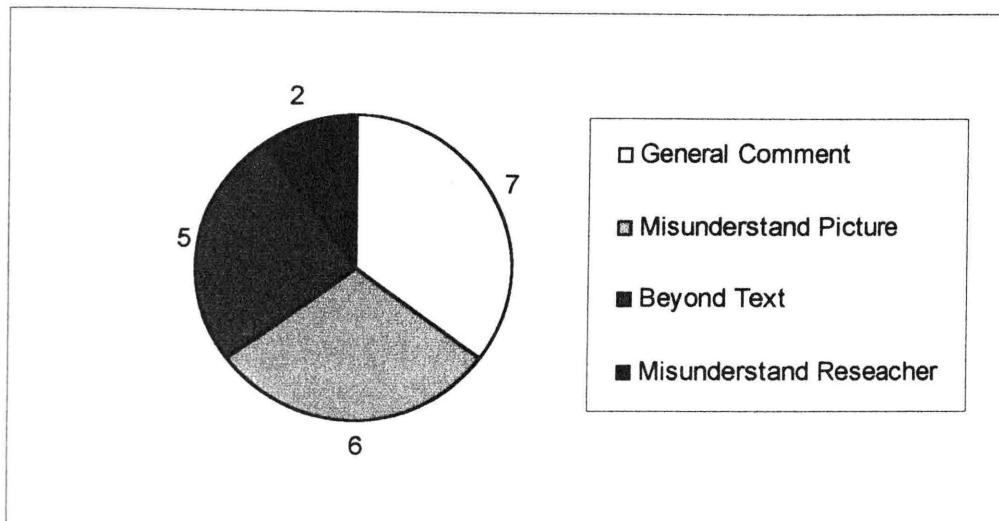


Figure 13. Other Responses.

Figure 13 represents responses within the other category. A description of each follows.

Misunderstanding

On six occasions children's responses revealed a misunderstanding of details presented in the books. The misunderstanding came from the pictures.

Erica mentioned *worms* as she was flipping through the book relating all of the animals that can lay eggs. She was referring to an insert of mosquito larvae that does look like worms.

I was the cause for two misunderstandings. Erica misunderstood another representation in the book. She pointed to an insert of a moth saying, "Butterflies lay eggs" – a fact that I mentioned in the introduction.

General Comment

Children made general comments about a book's topic seven times.

Without referencing the book, Erica commented, "A lot of things are new in this bat, bat book."

Beyond text

The children were observed going beyond the text five times.

Christopher went beyond the text, "Right here, right here he got cut when he was holding me up in the waves." Christopher's comment about getting cut in the water was not related to the content presented in Time for Bed (Nowak, 2002).

What I Would Like to Learn

To conclude our conversations I asked children if there was anything else they would like to know or learn about a book's particular topic. The following are some responses related by Christopher and Carley.

Christopher wondered why the girl in Time for Bed (Nowak, 2002) didn't take a bath. His response, "There's one thing they didn't do, take a bath!"

Carley wanted to know, "if bats like to stay up at night."

After reading What Lays Eggs? (Gracestone, 1998) Carley said, "I want to know how they lay eggs."

Summary

Known knowledge refers to information or topics that were related by either the child or the researcher during the book introduction or preview. New knowledge refers to topics that were not mentioned prior to reading a book. New knowledge does not

necessarily reflect new learning, yet it does indicate that the child was attending to the message in the book. Known and new knowledge were mentioned a similar number of times. The children confirmed and extended known knowledge; they designated and extended new knowledge. Responses reveal that they frequently referred to the pictures to refine known and new knowledge. Personal experiences with or without the book were related to a lesser degree. At times the children misunderstood details presented in the books, related general comments about a book's particular content, or went beyond the text with unrelated topics. The children expressed a desire to learn more about the topics presented in the books.

The Processing and Comprehending Association

After the data were analyzed to answer the two research questions, they were merged to discover relationships between the two questions. There appeared to be an association between the children's processing during reading and their after reading conversation. Table 17 represents the number of responses and corresponding reading quality at the page level. Examples are used to describe a few of those relationships in the following section.

Table 17

Responses and Corresponding Reading Quality: Page Level

Reading Quality	Number of Responses
Accurate	37
Solved	15
Self-Correction	6
Meaningful Approximation	14
Less Productive Attempt	7
Total	79

Parallel Processing and Responding

Accurate reading comprised the majority of the children's reading; 37 responses were related to pages read accurately the first time, with no apparent difficulty.

Carley read animals that lay eggs:

Snakes lay eggs.
Fish lay eggs.
Snails lay eggs.

Overt problem solving was not observed. She designated this new information after reading by referring to the photographs. "Snakes lay eggs. Fish lay eggs. Snails lay eggs."

The children referred to pages where meaningful approximations were made 14 times during the after reading conversations. Erica searched for meaning, structure and visual information when she substituted *mommy/many*.

Child: Mommy animals lay eggs.
Text: Many animals lay eggs.

After reading she responded, "...and many kind of animals can lay many different eggs," to confirm what I had said in the introduction.

Successive Processing and Responding

Fifteen responses related to pages where words were solved correctly. Erica solved *fur* after successive attempts.

Child: Bats have f - (looked at picture), fur.
Text: Bats have fur.

After reading Bats, Bats, Bats (Olearczyk, 2001) Erica commented about bats' fur, extending what I had introduced.

"...they're so soft like, like jackets ...but I like their fur."

Some responses related to pages where more than one type of overt processing behavior was observed; these instances were labeled varied. Varied reading was not included in the calculations.

Erica's reading was varied:

Child: (QLAP) Mommy snakes look
Text: Most snakes look

Child: af af-t-er and the -t- if you put the -er- and
Text: after

Child: the -t-er-er-er- so I think it's called after
Text: after Told

Child: the-ir, the eggs.
Text: their eggs

After reading Erica returned to the inserts that accompanied this text. She described the baby snake coming out of the egg, "...the baby snake is cracking open that bubble..."

The children responded the fewest number of times to pages where self-corrections and less productive attempts were made. Approximations that neglected meaning were observed on pages where varied reading was observed.

Summary

Similarities were observed between the numbers of responses made in relation to the general quality of reading at the page level. Accurate reading, by page, was observed most often; the children responded accordingly. Several responses corresponded to pages where words were solved successfully and meaningful approximations made. The children responded most infrequently to pages where self-corrections or less productive attempts were observed.

Summary of Findings

Parallel processing refers to the simultaneous use of multiple sources of information when reading. A large majority of accurate reading the first time and meaningful approximations indicate that parallel processing was implemented most often as the children read the nonfiction books.

Reading quality of technical terms and other words was similar. The children usually read both types of words accurately the first time; a slightly higher percentage of accurate reading was observed with other words.

Familiarity refers to knowledge known by the children. Known knowledge originated from the child or from the researcher. New knowledge denotes topics that were not mentioned before a book was read. After reading, children responded by referring to the picture, pointing to the picture and relating personal experiences, and relating personal experiences without the book. The responses reflected how knowledge was refined: known knowledge was confirmed or extended; new knowledge was designated or extended. Knowledge known by the child was confirmed and extended more frequently than that related by the researcher.

A majority of the after reading responses related to pages where parallel processing was evident with accurate reading and meaningful approximations. Several responses referred to pages where words were solved successfully. The children expressed a desire to learn more about the topics in the books.

CHAPTER V *Methodology: A different perspective on reading comprehension*

SUMMARY

The final chapter is organized by the following framework: (a) purpose, (b) methodology, (c) findings, (d) discussion, (e) a grounded theory of early readers in and nonfiction texts, (f) practical and theoretical implications, and (g) a chapter summary.

Purpose

The purpose of the study was to discover how early readers process information and comprehend the content presented in nonfiction texts. Observations and analyses of children's behaviors as they read provided insights regarding processing, attention, and comprehending during reading. Reading behaviors were analyzed to discover how children processed information when reading nonfiction books. Conversations with the researcher before and after reading revealed how the children's knowledge was verified, shifted, or changed during the reading process.

Methodology

Two questions guided the research:

1. How do early readers process information when reading nonfiction texts?
2. What do children's responses reveal about comprehending nonfiction texts?

The purposive sample (Merriam, 1998) consisted of five kindergarten children who displayed the behaviors characteristic of early readers (Fountas & Pinnell, 1996). I met with the five children individually for three reading response sessions. A different nonfiction book was used as the focus on each occasion. During the sessions I recorded oral reading behaviors and conversational responses. A grounded theory design (Strauss & Corbin, 1998) using the constant comparative method of analysis (Merriam, 1998) was used to discover how early readers process information and comprehend the content in nonfiction texts.

Several data sources provided triangulation to validate authenticity of findings (Silverman, 2001) and establish credibility (Erlandson et al., 1993). Sources documented through observation included running records, interviews, fieldnotes, and audio and video recordings. Handwritten and taped observations of children's behavior represented their reading behavior and interview responses during the 15 reading response sessions. Oral reading and conversational responses were transcribed in *Word*®. Data were organized in *Excel*® to facilitate flexible sorting options.

Categorizing and coding occurred as the data were being collected (Erlandson et al., 1993). Running records were scored and analyzed following the reading response sessions. Related language units from interview transcripts were grouped together to form categories that reflected comprehension or knowledge refined. Some categories were designated beforehand, new categories emerged and some of the original ones were replaced or revised. The constant comparative method was implemented (Merriam, 1998)

as I looked for similarities and differences (Strauss & Corbin, 1998) in the data. The categories were coded with labels that designated reading behaviors and oral responses.

The data, organized in spreadsheets for individual children, was merged to perform cross case analyses (Miles & Huberman, 1994). I performed the analyses by seeking patterns of evidence, emerging from and representing the data (Merriam, 1998), to build a grounded theory describing how early readers process information and comprehend the content presented in nonfiction texts.

Findings

The findings in this study were determined by the documented oral reading behaviors observed while children read nonfiction books; their conversational responses before and after reading were documented as well. The findings were established by the emergent patterns detected in the children's reading behaviors and conversation. They are specified by processing information and comprehending.

Processing Information While Reading Nonfiction Texts

The major findings reveal:

- ◆ Parallel processing is the simultaneous use of several sources of information to read written text. A large majority of children's oral reading behaviors indicate parallel processing through accurate reading the first time and meaningful approximations that sounded like accurate reading.
- ◆ Successive processing refers to solving attempts performed through two or more successive attempts. Solving and self-correcting words comprised most of the children's successive processing attempts.

- ♦ Approximations that neglected meaning and less productive attempts were observed less frequently.
- ♦ Reading quality of technical terms and other words was similar. Most of the words were read accurately, meaningfully approximated, solved or self-corrected.
- ♦ Children searched the pictures in the nonfiction books for meaning to facilitate processing. Picture use was usually supportive, but sometimes caused confusion.

Comprehending Nonfiction Texts

Major findings reveal:

- ♦ Children related known knowledge (information that was discussed before reading), and new knowledge (information that was not discussed prior to reading) about the same number of times.
- ♦ Responses revealed that the children referred to the pictures, the pictures and personal experience or personal experience with the book closed to relate known or new knowledge. References to the pictures were observed most often.
- ♦ The children made statements before reading; they confirmed or extended the statements after reading the nonfiction books. Confirming responses, without adding details to what was originally said, were the most frequent type of response. Extensions of known knowledge were occasionally observed.
- ♦ New knowledge was designated by a single word or simple statement without adding details. The children frequently designated new knowledge. Extensions or elaborations of new knowledge occurred less often.

- ♦ The majority of the children's reading was accurate the first time. The children responded accordingly – the majority of their responses related to pages read accurately. Responses were commonly made to pages where parallel processing resulted in meaningful approximations as well.

Discussion

This study explored how children process information while reading nonfiction texts and the nature of their comprehending. Several insights arose from the findings as the data was organized and analyzed. The following section begins with insights and conclusions that relate to the grounded theory that follows. They include: Parallel Processors Economize Attention, Constructors of Meaning, Comprehending Continues after Reading, Early Readers are Strategic Processors of Nonfiction Texts, Technical Terms and Other Words and Reader Stance: Learning Enjoyed.

Parallel Processors Economize Attention

Parallel processing signifies the simultaneous use of multiple sources of information; it is an indication that little attention is directed toward solving words (Clay, 2001; Rumelhart, 1994). When little attention is directed towards visual information, attention is free to attend to the messages contained in print (Clay, 1991). When attention is directed to the message, problem solving occurs within a context that is surrounded by meaning. The early readers in this study demonstrated the ability to search for multiple sources of information simultaneously as they read the nonfiction books both with accurate reading and meaningful approximations.

Carley searched for meaning and structure as she read.

Child: Mosquitoes do no look over their eggs.

Text: Mosquitoes do not look after their eggs.

The substitution sounded like correct reading; it made sense. She attended to the message and read the rest of the book without difficulty.

Although Christopher repeated similar substitutions when reading Our Farm, the errors were meaningful and he was able to attend to the message conveyed in the book: things we see on our farm.

Child: We see pumpkins on the shelf.

Text: We see pumpkins on our farm.

Child: We see a cow on the hay.

Text: We see a cow on our farm.

Parallel processing was evident as most of the children's reading was correct the first time. Parallel processing was observed with meaningful approximations that included the use structure and or visual information. These five children were able to solve words within a context of highly accurate reading and meaningful errors; attention was free to attend to the message conveyed in the nonfiction books.

Constructors of Meaning

The children were active constructors of meaning as they were reading the nonfiction books. Responses revealed that comprehending continued after reading.

Comprehending During Reading

Accurate reading indicates all is going well. All of the sources of information correspond to the text; "the message is understood by the reader" (Clay, 1991). The

children read the majority of words correctly the first time and several errors were self-corrected. The large proportion of words read accurately, meaningfully approximated, solved and self-corrected indicate that the children monitored and searched for meaning to facilitate processing while reading nonfiction books.

Meaningful approximations signify a search for meaning when attempting to solve words. Reading is a “message getting problem solving activity” (Clay, 1991) where readers purposely extract meaning from a text to understand the author’s message. Meaningful approximations accounted for the majority of children’s errors.

Carley’s substitution was meaningful; she searched for several sources of information.

Child: Bats eat all night.
Text: Bats eat at night.

Erica’s substitution indicates that she searched for visual information. Her substitution was meaningful, even though it was not grammatical.

Child: Snails do not look after they eggs.
Text: Snails do not look after their eggs.

The children demonstrated the ability to construct meaning, evidenced in their meaningful approximations, as they read the nonfiction books. Instead of viewing these approximations as problematic we should view them as evidence of their continuing literacy development (Clay, 1993b; Newkirk, 1987). Errors, consisting mainly of meaningful approximations, occurred within stretches of highly accurate reading, indicating that children were “engaged in comprehending” (Goodman, 1994) as they read the nonfiction books.

Comprehending Continues After Reading

Comprehending is a process that occurs during reading and continues afterward. Comprehension or understanding may change after a text is read as meaning is reconstructed (Goodman, 1994). The children constructed meaning on their own after reading, with minimal assistance from me. The numbers of responses relating known and new knowledge were similar. The children read and related topics and details that had not been discussed prior to reading just as readily as those that were. Erica related new knowledge, crabs lay eggs, and known knowledge, chickens lay eggs, after reading What Lays Eggs? (Gracestone, 1998).

Known knowledge is information or topics related before reading by either the child or myself. All of the children confirmed known knowledge. Carley confirmed her prereading statement that owls like to fly after reading, "I think owls like to fly." She verified what she knew about owls, constructing meaning after the text was read. Known knowledge became more familiar.

Known knowledge was extended. Erica extended known knowledge. Before reading she mentioned that fish lay eggs. After reading she extended what she knew, "...fishes can lay eggs from many different ponds, or, or different lakes."

New knowledge refers to topics that were not discussed in our prereading conversations. The children may have actually known the specific topic or detail. Even so, referencing new topics indicates that the children were attending to the message. Meaning was constructed as the children designated and extended new knowledge. Carley constructed meaning when she designated, "Um I never knew that snakes laid

eggs.” She subsequently referred to the other animals in the book. Carley learned something new about animals she was most likely familiar with. Comprehending shifted and meaning was reconstructed.

The children extended new knowledge independently. Erica explained, “Owls can have sharp claws that can like, that like can scrape people that comes near these kind of owls.” Erica learned that owls have sharp claws; she extended when she added that sharp things can scrape people; learning was enhanced.

These five children were independent, active meaning constructors before, during and after reading the nonfiction books; they were able to learn from the information presented in the nonfiction books they read.

Early Readers are Strategic Processors of Nonfiction Texts

As children are gaining control over literacy learning they begin to develop strategies to solve unknown words when reading. Terms used to represent processing strategies are self-monitoring, searching, and self-correction. Self-monitoring means checking on yourself when reading. A child who is reading accurately is self-monitoring. It may be observed when a child stops or give signs of uncertainty (Clay, 1993b). Searching is the gathering of information, used for the first attempt to read, or looking for more information with successive attempts to solve and/or self-correct (Clay, 1991; Schwartz, 1997). Self-correction refers to the rejection of an error response.

The five kindergarten children in this study were strategic processors of information as they read the nonfiction books. Observed behaviors to solve, self-correct, and substitute words provide evidence of strategic processing. The children frequently

attempted unknown words by searching the picture for meaning and by means of a sound analysis, or both.

Erica substituted *at/eat* and hesitated. She noticed that something was not right.

The hesitation indicates that she was strategic; she self-monitored her reading.

Erica solved *sleep* by searching for phonological information using the initial letter

Child: Bats (hesitated) s - sleep all day.
Text: Bats sleep all day.

Erica attempted *fur* with a sound analysis followed by a successive search for meaning by looking at the picture.

Child: Bats have, (hesitated), f, (looked at picture) fur.
Text: Bats have fur

Carley solved *makes* by searching for phonological information; she articulated the initial cluster, with a subsequent search at the word level.

Child: mu - make, makes

Christopher read *our/a*; he quickly made a subsequent search and read *a*. He self-corrected his error.

Erica self-corrected *nails/claws*. She initially searched for meaning and structure. She monitored her reading and noticed that something wasn't quite right. She conducted another search at the initial letter level and possibly searched for additional meaning.

Erica self-corrected the technical word *claws*.

The most frequent strategic behavior used by Sue Garrick's (1992) first grade students was sounding out a word or part of a word. Her students mentioned that the

illustrations were supportive as well. Results from this study substantiate her findings; the five early readers searched for meaning using the picture and searched for phonological information by attempting to “sound out” unknown words.

The reading responses observed with these early readers revealed that the children actively applied problem-solving strategies to construct meaning in the nonfiction texts they read. Learning to read informational text is a “meaning driven, constructive process” (Pappas, 1991, p. 222).

Technical Terms and Other Words: Processing Partners

Reading quality for technical terms and other words was similar. Technical terms were read correctly, meaningfully approximated, solved and self-corrected: behaviors that indicate the message is being understood and meaning is under construction.

Christopher repeatedly substituted technical terms and other words as he read Our Farm; his approximations did not alter the message conveyed in the book.

Child: We see pumpkins on the shelf.
Text: We see pumpkins on our farm.

Child: We see a cow on the hay.
Text: We see a cow on our farm.

Pappas (1993) analyzed children’s ability to acquire lexical items in stories and informational texts. She discovered that the children were equally successful, regarding their use of lexical items, when reenacting both types of written genres. The behaviors of the early readers participating in this study substantiate her findings. These five children had no more difficulty reading the technical terms presented in the books than any of the

other words. The children were active constructors of meaning as they read both technical terms and other words.

Reader Stance: Learning Enjoyed

Readers adopt particular stances when reading to help them construct meaning during the transaction that takes place between the reader and the text. A reader adopts an *efferent stance* when reading to learn something. An *aesthetic stance* is more personal. A reader's emotional involvement in the text facilitates creating images from what is written and heightens awareness and understanding about the feelings, passions, and conflicts that emerge throughout the text (Rosenblatt, 1994). Although a specific genre usually determines the predominant stance a reader assumes, readers can adopt both stances to varying degrees while reading a single piece of text. Readers typically adopt a predominantly efferent stance when reading nonfiction.

Most of the children's responses after reading were made in a matter of fact, straightforward manner indicating an efferent stance. Erica and Carley assumed an efferent stance as they related information about what they had read.

After reading What Lays Eggs? (Grestone, 1998) Carley responded, "Um, I never knew that snakes laid eggs." She responded in the same straightforward manner after reading Bats, Bats, Bats (Olearczyk, 2001). "Well I never knew that bats can live on trees," and "Now they're just hanging upside down when they're sleeping in the cave."

Erica related animals that can lay eggs listing, "... frogs, crabs, butterflies, snakes, fishes, snails, mosquitoes, worms, chickens and that's all." She appeared to have an

efferent stance when talking about bats, "... or they can either sleep in trees or in caves, or they can eat at night."

Children's responses reflected their feelings of joy, excitement, fright or fear indicating an aesthetic stance.

Erica seemed to like the baby snakes, "They're kind of cute."

Carley expressed joy when she compared an owl's feathers to her shirt, "I like this part cuz it has pretty feathers that are like my shirt." She expressed fear when commenting about bats being like insects, "... sometimes I get afraid of them." An owl's eyes were frightening as well, "... a owl really had big eyes, cuz they're so big and so scary."

Christopher smiled when he commented about the girl reading a story before going to bed, "... she's reading a story with her dad and this looks like mine."

Christopher read, "We ski down the hill" and exclaimed, "Geronimo!" His response suggests the feeling of excitement at the thought of skiing down a mountain. After reading, Christopher compared the ski poles to swords, "On guard, they could have a sword fight with them too, ching, din, dun, pow! That would hurt!"

The children frequently assumed an aesthetic stance when reading or responding to the texts, becoming emotionally involved with the nonfiction books they had learned from.

Early Readers and Nonfiction Text: A Grounded Theory

A grounded theory describing how children process information and comprehend the content presented in nonfiction books was developed from the categories that

emerged from the data. The theory was derived through my perceptual lens and shaped by my worldview (Merriam, 1998). “Another researcher coming from a different theoretical orientation and having another research question, might arrive at quite another interpretation (Strauss & Corbin, 1998)”.

Generalizations developed from naturalistic inquiry pertain to the particular situations or contexts of that study. The findings and grounded theory put forward in this study are generalized to this particular population of early readers in the particular context (Patton, 2002, cites Guba and Lincoln 1981) in which our sessions occurred. *Transferability*, rather than generalizability, suggests how the findings of qualitative research may be used. How are the findings from the first or original context applicable in new situations or contexts? (Lincoln & Guba, 1985)

The findings used to develop the grounded theory are based on my interpretations of the patterns of observed behaviors demonstrated by the five kindergarten children who participated in the study. The findings and grounded theory are not a conclusion but should be thought of as a working hypothesis (Patton, 2002, cites Cronbach 1975 and Guba 1978) to be applied with other children in other contexts thereby extending “beyond the narrow confines of the data” (Patton, 2002, p. 583). The findings and theory derived from the unique situation with these five children may be considered as a working hypothesis to be used in a broader context with early readers as they process information and comprehend the content presented in nonfiction materials.

Knowledge refined is the central conceptual category. Knowledge refined signifies the construction of meaning or comprehending reflected in the children’s

responses. Knowledge refined is influenced by processing during reading as children learn about print and learn from print. Knowledge refined is facilitated through the connections, a child makes with the book, following reading.

The act of learning is an act involving three simultaneous processes; the first is acquisition. Acquisition may be “drastic,” replacing or running contrary to what has previously been known. Acquisition may enhance or heighten awareness of specific knowledge or concepts or may simply refine knowledge (Bruner, 1977). Knowledge refined is similar to the acquisition process of learning described by Bruner. The children’s knowledge was refined as they learned about print, learned from print, and conversed after reading. The nature of refinement - confirmed, designated or extended reflects the degree of that acquisition: usually an enhancement, expansion or refinement of knowledge with the early readers in this study.

Three interrelated categories influence and facilitate knowledge refinement: learning about print, learning from print and connections. Each is described separately in the following sections. The relationships between the three categories are woven together to capture the essence of how children process information and comprehend the content presented in nonfiction books. Examples from sessions with Erica reading, What Lays Eggs? (Grestone, 1998) and Carley reading Bats, Bats, Bats (Olearczyk, 2001) illustrate the theory.

Early Readers Learn About Print As They Read Nonfiction Books

Beginning readers are children who are learning to read and write. During the first three years of school children develop a processing system that enables them to problem

solve on increasingly difficult texts. These changes take place over time, from 5 to 8 years of age, as children develop control over written language (Clay, 1991). Early readers are beginning readers developing control over written language as they acquire a processing system.

The recorded observations of the children's oral reading behaviors indicates their developing control over written language at a particular time in their reading development. The children's reading responses reveal how they were learning about print in the process of learning how to read. The knowledge sources put forward in Rumelhart's Interactive Model (Rumelhart, 1994) provide a framework for the discussion. The section Interactive Model of the Reading Process in Chapter II provides an in-depth description of the model.

Feature Level Knowledge

Children begin to differentiate letters by their features as they are learning how to read (Clay, 2001). Discrimination between letters with similar shapes is more difficult to perceive than letters with quite different shapes.

Carley's substitution indicates a simultaneous search for several sources of information including letter features.

Child: Bats eat all night.
Text: Bats eat at night.

The substitution was meaningful and grammatically correct. Carley's search for visual information includes letter level information – *a* begins *at* and *all*. She may have searched for letter features as well *l* and *t* have similar shapes. Early readers are

developing visual perception; Carley did not discriminate between the two visually similar letters.

K and *v* have different features. Christopher may have been monitoring feature level information when he conducted a subsequent search to self-correct *like/live* while learning more about print as he self-corrected the error.

Child: We like, we live on our, a farm.

Text: We live on a farm.

The self-correction may have confirmed a previously successful response or Christopher may have tried a new way of responding to correct his error.

Letter-Level Knowledge

Known letters provide “footholds” for children as they are learning to read (Clay, 2001). Known letters and their sounds can help children solve new or unknown words when they are reading.

Erica solved *sleep* with a quick search for phonological information using the initial letter.

Child: Bats (hesitated) s - sleep all day.

Text: Bats sleep all day.

Erica articulated initial letter sounds to solve other words as well. She sometimes articulated isolated letter sounds within words.

af, af-t-er

She searched for known letter sounds as “footholds” (Clay, 1991) to aid in solving unknown words; refining her knowledge of phonological information at the letter level.

Letter-Cluster Knowledge

Attending to letters as clusters or chunks enables children to solve unknown words when reading or writing by finding analogies with what is known (Clay, 2001). Observations reveal that the children used letter-cluster knowledge.

Erica attempted to solve *sharp* using known clusters.

Child: shuts
Text: sharp

Although Erica was told, *sharp*, the attempt indicates increasing control over print.

Lexical-Level Knowledge

Beginning readers may find it difficult to discriminate between letters and words. “The words read are the vehicles for using letter-feature, letter-sound, and letter-cluster knowledge to clinch decisions” (Clay, 2001, p. 109).

Erica substituted *mommy/most* at the word level.

Child: Mommy animals lay eggs.
Text: Many animals lay eggs.

She substituted one visually similar word for another, using letter-feature and letter-cluster knowledge. She did not discriminate at the letter-sound level; *m* and *n* have different sounds. Her decision was “clinched” because the sources of information fit.

Syntactic Knowledge

Syntactical decision making is influenced by children’s spoken language, sentence beginnings, punctuation, intonation and expression, and phrased and fluent reading (Clay, 2001). The children appeared to have little difficulty accessing the simple

text structures that comprised most of the language in the books, contributing to their developing awareness and control of written language structures.

Carley and Erica both read the repeated phrase in What Lays Eggs? (Gracestone, 1998) with little difficulty.

Snakes lay eggs.
Fish lay eggs.
Snails lay eggs.

They both experienced difficulty with the phrase, *look after their eggs*. Carley read:

Child: af, afric, af-i-t-y-ter
Text: after

After several attempts at the cluster and letter levels Carley was told *after*. She read the repeated pattern on subsequent pages; she was learning more about syntactical structures that are presented in print.

Semantic-Level Knowledge

“All readers have to construct meaning to comprehend text” (Clay, 2001, p. 111).

Young children’s preschool experiences both with and without text vary. These experiences influence comprehending while reading (Clay, 1991; Goodman, 1994; Rumelhart, 1994).

Carley substituted:

Child: Bats can l-leave in a tree.	Bats can leave in a cave.
Text: Bats can live in a tree.	Bats can live in a cave.
Child: Bats can live in a tree.	Bats can live in a cave.

She reread to self-correct searching for additional meaning and visual information; *bats can live in a cave* makes more sense than *bats can leave in a cave*.

Summary

The children verified, clarified, learned and refined ways to monitor, search and self-correct while reading using multiple sources of information. The children constructed meaning about print as they read the nonfiction books; the process of learning to read was facilitated through nonfiction texts.

Early Readers Learn From Print As They Read Nonfiction Books

Processing refers to how children access, use and relate information from a variety of sources to understand written texts. Observations of children's reading behaviors indicate how they are processing information and constructing meaning while reading. When children's attention is free from problem solving they are free to direct attention to the message.

Parallel Processing

Early readers are in the process of developing control over written language as they acquire a processing system. They are developing a system that economizes the simultaneous use of multiple sources of information, characteristic of parallel processing. Parallel processing is an indication that little attention is directed toward solving words (Clay, 2001; Rumelhart, 1994). Attention is free to focus on the message when there is minimal problem solving work going on (Clay, 1991).

Accurate reading

Accurate reading is parallel processing, indicating that all is going well with the reading process. All of the sources of information correspond to the text; "the message is

understood by the reader" (Clay, 1991, p. 296). The children read the majority of the words correctly the first time.

Erica and Carley both read animals that can lay eggs with little apparent difficulty.

Snakes lay eggs.

Fish lay eggs.

Snails lay eggs.

Christopher read things we put on to ski correctly; minimal attention was directed to solving words.

We put on our jackets.

We put on our hats.

We put on our goggles.

Meaningful approximation

Meaningful approximations that sound like correct reading signify parallel processing as children aim to understand the message.

Carley's substitution was meaningful when she conducted a simultaneous search for several sources of information.

Child: Bats eat all night.

Text: Bats eat at night.

Evidence of parallel processing was observed when Carley substituted *all/at*.

She searched for meaning, structure, and visual information. All of the pieces fit and she read on; meaning was intact.

When reading Our Farm (Stango, 2001) Christopher searched for meaning and grammatical information with repeated substitutions of technical items and other words.

Child: We see pumpkins on the shelf.
Text: We see pumpkins on our farm.

Child: We see a cow on the hay.
Text: We see a cow on our farm.

The considerable amount of accurate reading and meaningful approximations made by the children signifies that minimal attention was directed toward word solving; maximum attention was given to the message represented by print. The children constructed meaning as they read the nonfiction books.

Successive Processing

Children apply successive processing as they learn to read. They attend to one piece of information at a time in a series of actions while attempting to solve words (Clay, 2001). Successive solving and self-correction behaviors indicate a search for meaning as the children attempted to understand the message.

Solved

Carley solved the technical item *feathers* as she searched for meaning with a quick look at the picture of a white and brown owl standing on a tree branch. All sources of information fit and she read on.

Child: An owl has (looked at the picture) feathers.
Text: An owl has feathers.

Erica originally searched for phonological information at the initial letter level by articulating /f/. She made a subsequent search for meaning when she looked at the

photograph of a furry bat. She solved *fur* successfully and continued reading.

Child: Bats have, (hesitated), f, (looked at picture) fur.
Text: Bats have fur.

Self-correction

The children self-corrected errors. Frequently the errors were meaningful to begin with; self-corrections indicated a search for visual information and/or additional meaning.

Erica self-corrected her substitution *nails/claws*.

Child: sharp nails, claws
Text: sharp claws

The error indicates that Erica was searching for meaning while using structure.

She self-monitored, realizing something was wrong and conducted a successive search using visual information at the word level; she may have searched for additional meaning as well. She self-corrected the error; all of the information fit.

Carley self-corrected two errors.

Child: Bats can l-leave in a tree. Bats can leave in a cave.
Text: Bats can live in a tree. Bats can live in a cave.

She reread the two pages.

Child: Bats can live in a tree. Bats can live in a cave.

Both substitutions indicate that Carley was using several sources of information, meaning structure and visual information, up to the point of error. After reading on, she noticed the discrepancy and self-corrected both errors. *Bats can live in a tree or cave* makes more sense than *bats can leave in a tree or cave*. Meaning drove her reading.

Summary

The significant number of words read accurately, meaningfully approximated, solved, and self-corrected indicates that the children monitored and searched for meaning to facilitate processing while reading nonfiction books. These early readers were active meaning constructing strategic processors of information as they were learning about print and learning from print. The children were learning to read as they were reading to learn.

Connections Facilitate Knowledge Refinement

Responding behaviors refer to what the children did with the book to relate topics, details or information about what they had read. The children used the books by referring to the picture, referring to the picture while relating personal experience and relating personal experience without the book. The category *connections* conceptualizes the responding behaviors. Connections refer to links children were making with or from the book to refine knowledge; the links are not observable, but are inferred from the child's behavior. The Chapter IV sections Known Knowledge Refined and New Knowledge Refined provide a detailed description of the children's responding behaviors. The following section describes how the children's connections, reflected by responding behaviors, facilitated refinement of their knowledge.

Pictures

Erica referred to the pictures to confirm information she had mentioned before reading What Lays Eggs? (Grestone, 1998) She repeated the simple language structure in the book to relate, "Frogs lay eggs... snakes lay eggs, fish lay eggs, snails lay eggs..."

Erica did not offer any additional details to what was presented in the text. Her understanding of animals that lay eggs was confirmed or clarified by the connections she made with the book.

Before reading What Lays Eggs? (Grestone, 1998) Erica noted that snails lay eggs. The picture was an object that facilitated the extension of known knowledge, "They can lay white eggs or shiny bright eggs, like those." Meaning was constructed after reading as she described snails' eggs: knowledge was refined.

Carley designated new information by referring to the pictures. "Um, I never knew that snakes laid eggs." Carley never knew that fish or snails laid eggs either. Familiarity was labeled as new, because she did not refer to those animals before reading. Carley probably did know that snakes, fish or snails are animals; she may have learned that the animals she was familiar with are egg layers as well. New knowledge was becoming partially known. The response was facilitated through the picture to designate new information as her understanding about snakes, fish, and snails was enhanced.

Pictures and Personal Experience

Connections made by Christopher, with the pictures and personal experience facilitated the extension of known knowledge. During the introduction to We Ski (Grestone, 1997), I mentioned, that we need to put on goggles to ski. After reading Christopher, extended what I had said, "They look like aliens when they put on their goggles." Christopher's use of *aliens* indicates that he was relating to personal experience. Awareness of goggles was enhanced; Christopher constructed meaning by making connections with the picture while relating personal experience.

Erica extended new knowledge through connections made with the picture and personal experience. "Owls can have sharp claws that can like, that like, can scrape people that comes near those kinds of owls." The fact that owls have sharp claws was not mentioned before reading; therefore it is considered new knowledge: learning was enhanced through her personal experience of sharp things that scrape.

Personal Experience

After reading, Erica extended my remark that bats have fur. "I like their fur because they're so soft like jackets and they have like jackets, they have like fur inside of jackets." Connecting to personal experience facilitated an extension of known knowledge; Erica constructed meaning, building upon previous learning.

During our after reading conversation Christopher exclaimed, "On guard, they could have a sword fight with them too! Ching, din, dun, pow! That would hurt!" Ski poles had not been discussed before reading the book. He extended his learning by connecting to his personal experience of swords.

Summary

The children, without direction from me, established connections to construct meaning after reading. Knowledge was verified, clarified, and enhanced; knowledge was refined; learning took place.

How Children Learn From Nonfiction Texts

Knowledge refined refers to how children's knowledge was verified, changed, shifted or expanded after reading a book. After reading the children refined known and new knowledge almost equally; reading the nonfiction books was a meaning driven

process as children learned from the books' contents. Tables 18 and 19 represent the relationships between reading quality, as a result of processing, and how the children comprehended topics presented in the books.

Known knowledge refers to knowledge stated by the child or researcher during the introduction. The children confirmed known knowledge by restating what was said without adding additional details. Familiar or partially familiar topics became better known as they were confirmed. Known knowledge was extended by elaboration, enhancing familiar topics.

Table 18 depicts the children's preferred responses, regarding known knowledge, that were generated through conversation after reading the nonfiction books. Each child responded in other ways as well; this table depicts how each child typically responded regarding known knowledge. Familiarity denotes who commented about topics; it refers to who the known information originated from: the child or the researcher. Erica, Carley, Joseph, and Sara refined known knowledge by referring to pages read accurately; Christopher referred to pages where meaningful approximations were made. Two items indicate that the child responded similarly in that regard. For example, Erica, Carley, and Christopher responded to known topics mentioned by themselves and the researcher almost equally. Erica and Christopher confirmed and extended known knowledge just about equally across the three different reading response sessions.

Table 18

The Processing and Comprehending Association: Known Knowledge

Child	Reading Quality	Familiarity	Connections	Knowledge Refined
Erica	Accurate	Child Researcher	Picture	Confirm Extend
Carley	Accurate	Child Researcher	Self and Picture	Extend
Christopher	Meaningful Approximations	Child Researcher	Self and Picture	Confirm Extend
Joseph	Accurate	Child	Picture	Confirm
Sara	Accurate	Researcher	Self	Confirm

New knowledge refers to topics that were not discussed in our prereading conversations. New knowledge may actually be familiar to a child; communication of new knowledge indicates that attention was directed towards the message. The children designated new knowledge by relating a single word or simple statement without elaboration. Designations verify or clarify what was read in the text. New knowledge was extended when details were added; the children elaborated about a topic. Extensions enhance and heighten topical awareness.

Table 19 depicts the children's preferred responses, regarding new knowledge, generated through conversation after reading the nonfiction books. Each child responded using other ways; this table depicts how each child typically responded regarding new knowledge. Erica, Carley, Christopher and Joseph refined new knowledge by responding

to pages read accurately the first time. Sara responded to pages where she made meaningful errors. Christopher designated and extended known knowledge a similar number of times.

Table 19

The Processing and Comprehending Association: New Knowledge

Child	Reading Quality	Connections	Knowledge Refined
Erica	Accurate	Picture	Designate
Carley	Accurate	Picture	Designate
Christopher	Accurate	Self	Designate Extend
Joseph	Accurate	Picture	Designate
Sara	Meaningful Approximations	Self	Extend

A Model of the Grounded Theory

A model of the grounded theory of early readers and nonfiction texts is depicted in Figure 14 . Parallel processing, indicating the simultaneous direction of attention, comprised most of the children's reading. Meaning is central to the entire process, as it is constructed and reconstructed. Parallel processing is characterized by accurate reading the first time and meaningful approximations sounding like accurate reading. Successive processing attempts often resulted in words solved successfully or self-corrected. The quality of reading, resulting from processing, influenced the children's responses after reading, refining knowledge. After reading the children made connections with the

pictures, pictures and personal experience or personal experience only. The connections facilitated knowledge refinement.

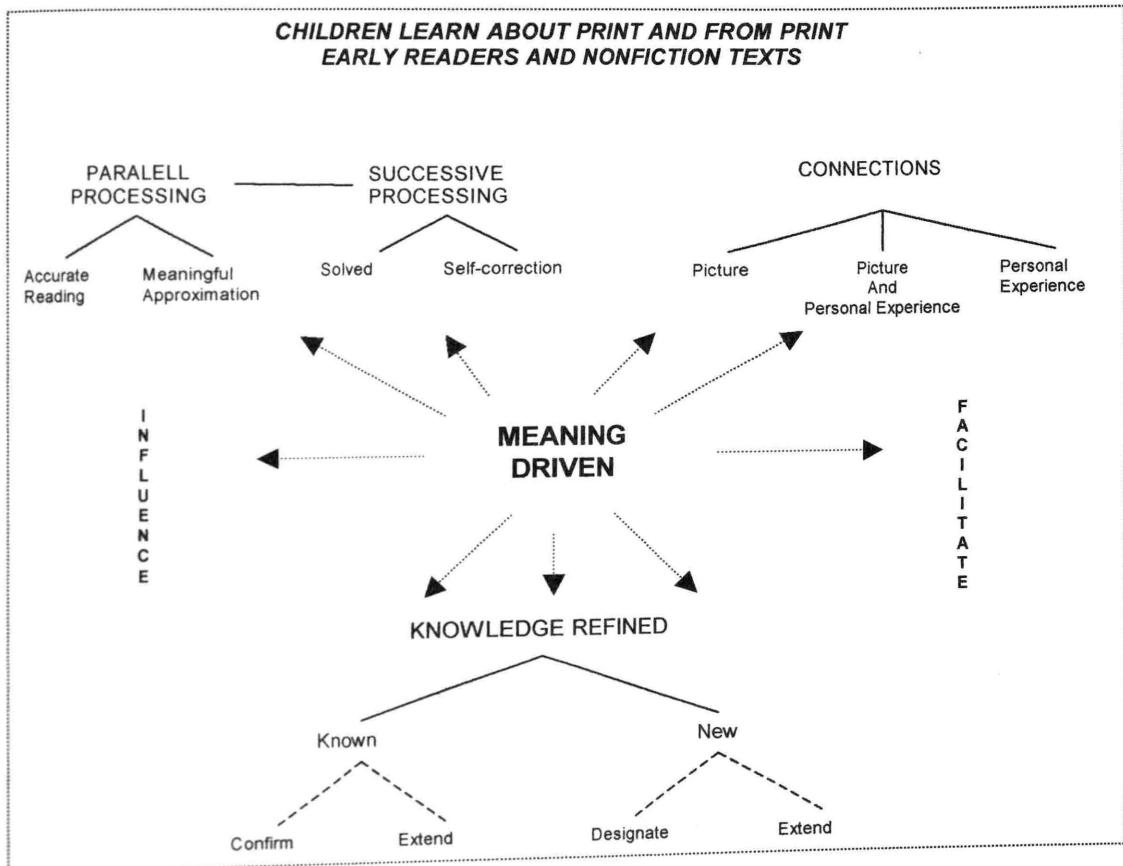


Figure 14 Early Readers and Nonfiction Texts.

Reading and Responding: An Illustration

The interrelated concepts reading quality (as a result of processing), connections and knowledge refined are linked together through meaning to shape the grounded theory of early readers and nonfiction texts. The theory is illustrated as the concepts are woven

into the following descriptions taken from one of Erica's and Carley's reading response sessions. Erica's oral reading and conversations regarding What Lays Eggs? (Gracestone, 1998), and a description of Carley's oral reading and conversational responses referring to Bats, Bats, Bats (Olearczyk, 2001) follow.

Erica – What Lays Eggs? (Gracestone, 1998)

Erica read What Lays Eggs? with 80% accuracy. Although the book was "hard" (below 90% accuracy) she read three pages correctly the first time with little apparent difficulty. *Reading quality* was observed with parallel processing reflected by her accurate reading and many of her error substitutions. Meaningful approximations comprised most of her errors. She searched for multiple sources of information simultaneously; the meaningful errors matched with the text and she read on. After reading, Erica frequently made *connections* by referencing the three pages she read correctly. Many other responses corresponded to pages where meaningful approximations substituted words in the text. She discussed topics related to, but not specifically presented in, the book as well. *Knowledge refined* was evident by Erica's frequent confirmation and extension of known knowledge. Learning was linked to what was mentioned prior to reading; familiar or partially familiar knowledge was verified and enhanced.

Erica confirmed or *refined knowledge* conveyed by the researcher. During the introduction I mentioned that mosquitoes lay eggs. The topic was known since it was discussed before she read the book. *Reading quality* resulted in a less productive attempt,

Erica's successive processing efforts to solve mosquitoes ended up with a told.

Child: mouth m-o I wonder what that's called mosquitoes
Text: mosquitoes Told

Child: Mosquitoes lay eggs. "I know what they're called I kind of forgot."
Text: Mosquitoes lay eggs.

Erica may very well have known and forgotten what mosquitoes are; perhaps having felt the sting of their bite. She noted that mosquitoes lay eggs later in the conversation, further confirming known information. *Connections* were made as she pointed to the picture on both occasions. Her partial knowledge of mosquitoes became more familiar. *Knowledge was refined* and meaning was constructed; comprehending continued after the nonfiction book had been read.

Erica made inferences through *connections* made with the pictures, to extend knowledge that was previously known by her. She described how snail and snake eggs might hatch. The snail eggs, "... can come from here to there all the way down until the eggs crack open." Photo inserts depicted snakes' hatching cycle. She pointed to the inserts while relating, "... like the baby snake is cracking open that bubble..." Erica's learning was enhanced as she attempted to understand how snail and snake eggs hatch; *knowledge was refined.*

As Erica previewed the book she related that fish lay eggs; the knowledge was known by the child. *Reading quality* of the sentence *Fish lay eggs* was accurate the first time. *Knowledge was refined* after reading by extending what was previously known. Erica *connected* to personal experiences. “And also that fishes can lay eggs from many different ponds or, or different lakes.” The fact that fish lay eggs in water was not

specifically presented in the book. Erica extended known knowledge; meaning continued to be constructed after reading the book.

New knowledge was designated as Erica referred to photo inserts of a frog, crab and moth. "...frogs, crabs, butterflies..." Erica confirmed known knowledge about frogs. She mentioned the fact that frogs lay eggs while previewing the book. The fact that crabs lay eggs was not mentioned in the text. Erica inferred new knowledge from a *connection* made with the picture, about another animal that lays eggs: crabs. *Reading quality* consisted of a meaningful approximation observed on the corresponding page of text.

Child: Mommy animals lay eggs.
Text: Many animals lay eggs.

Attention was directed toward the message, Erica's reading was meaning driven; meaning was constructed and known and new *knowledge refined* through *connections* made after reading.

Erica flipped through the book, making *connections* using the photographs. She *refined knowledge* by confirming what was known before she read the book: *snakes, fish, snails, mosquitoes and chickens* all lay eggs. Attempts to solve *mosquitoes* resulted in a told. *Snakes, fish, snails* and *chickens* were all read correctly. Minimal problem solving occurred on those pages; Erica's attention was directed toward the message. She clarified what she already knew; familiar knowledge became better known; meaning was constructed and learning took place as *knowledge was refined*.

Most of Erica's after reading responses related to pages where she applied parallel processing; *reading quality* was accurate or meaningful approximations indicated a

simultaneous search for multiple sources of information. *Knowledge was refined* by confirming and extending topics known by her. *Connections* made using the pictures before, during, and after reading facilitated comprehension.

Carley – Bats, Bats, Bats (Olearczyk, 2001)

Carley read Bats, Bats, Bats at an independent level, 96% accuracy. Parallel processing facilitated *reading quality* that was mostly accurate, with little problem solving at the word level. A meaningful approximation indicated a simultaneous search for multiple sources of information. Self-correction of two errors, *leave/live*, indicates that her reading was meaning driven. Her attention was directed towards the message. Carley constructed meaning while reading known and new topics; comprehension continued after reading as she related details about those topics making connections using the pictures and personal experiences. Carley frequently extended known knowledge after reading; knowledge was refined as understanding of familiar topics was enhanced.

Before reading Carley stated, “Bats can hang upside down on trees.” *Reading quality* on this page was a self-correction of an error *leave/live*. *Connections* after reading were made using a photograph and relating personal experience. After reading she referred to a photograph with two bats hanging upside down on a tree branch and commented, “I liked this part because the bat is hanging upside down and I hang upside down on the couch.” She constructed meaning by extending or *refining* previously known *knowledge*; Carley related her personal experience of hanging upside down on the couch to a bat hanging upside down on the tree in the photograph.

Carley knew the fact that bats hang upside down before reading the book. She extended or *refined* this known information while making an inference about where bats sleep. She *connected* to personal experience with the book closed, as she related, "Now they're just hanging upside down when they're sleeping in the cave." A photograph depicted bats sleeping upside down in a cave; the accompanying text says *Bats sleep all day*. The resultant *reading quality* of parallel processing was correct reading the first time. Carley's attention was directed to the message and after reading she extended what she knew about bats hanging upside down.

Carley related new information about bats without the book. Her connection to personal experience facilitated *knowledge refinement*. She extended, "...I bet they get really tired at midnight because they're flying too long..." Her explanation concerning bats' nocturnal habits was related to the book's content, and was not specifically presented therein.

Carley's responses related to *reading quality* on pages that she read accurately or made self-corrections. Other responses were related to pages where parallel processing resulted in meaningful approximations, with minimal attention directed toward problem solving words. Carley's responses reveal that she constructed meaning by making *connections* between the text, pictures and her personal experiences to *refine* previously known topics and facilitate new learning.

Summary of the Theory

Early readers construct meaning through parallel processing where maximal attention is directed toward the message contained in the print. Reading quality, as reflected by processing, influenced conversation and knowledge refinement after reading. The children's responses typically corresponded to pages where words were read accurately, meaningfully approximated or solved. The connections, made to pages with parallel processing or successive processing with successful solving or self-correcting, influenced knowledge refinement. Connections made with the pictures and/or personal experiences facilitated knowledge refinement. Confirming known or designating new topics refined knowledge; what was known or partially known became more familiar. Known and new knowledge were extended: awareness heightened and learning enhanced. These early readers were active constructors of meaning while reading nonfiction books; the children attended to the message as they learned about print and learned from print. The children were active constructors of meaning after reading nonfiction books, the children connected to the book, as comprehending continued and knowledge was refined.

Practical and Theoretical Implications

The following section includes practical and theoretical implications that focus on developing young children's proficiency with informational texts.

Abundance of Nonfiction Genres

Several researchers have urged that children be exposed to an expanded repertoire, of genres in their early years of schooling, suggesting that greater

representation of informational genres be included in classrooms, to create a better balance between narrative and nonfiction texts (Caswell & Duke, 1998; Donovan et al., 2000; Pappas, 1993). Implications from this study clearly support that plea. Findings from this research support evidence that young children are purposeful (Caswell & Duke, 1998; Donovan & Smolkin, 2002), strategic constructors of meaning as they read (Pappas, 1991, 1993) a variety of informational genres.

Early readers are beginning readers developing proficiency with written texts on their journey to literacy. Early readers demonstrated the ability to read and converse about nonfiction books meaningfully; they were competent processors and comprehenders of information presented in nonfiction texts. Expanding children's experiences with nonfiction genres will enable children to develop the competencies with those genres that they have demonstrated time and time again; lopsided attention that emphasizes narrative texts impedes nonfiction genre development. Why should children be denied equal opportunities to develop proficiency with texts that they are equally able to read and comprehend?

It is the responsibility of educators to provide, rather than deprive, young children with an abundant assortment of nonfiction genres in all components of literacy instruction in their classrooms. Primary classrooms containing a variety of printed materials in a variety of genres, with varying levels of difficulty take into account of the variety of interests and abilities of the children comprising the classroom community.

Children Respond to Texts that are Readable

Young children display a wide range of reading and writing abilities. Observation is a particularly appropriate form of assessment for children up to 8 years old (Clay, 2002). Running records are observational tools teachers can use to assess children's developing proficiency with nonfiction texts. Texts read at an instructional level (90%-94% accuracy) contain some errors, thereby providing evidence of the problem solving responses children engage in. Analysis of errors and problem solving behaviors provides insights about the strategies children use to access sources of information while reading nonfiction texts. Knowledge of what a child controls enables a teacher to effectively plan subsequent instruction aimed at where the child needs to go next. Learning is facilitated when children read at an instructional level (Clay, 2002). Children will learn more about print through numerous opportunities to read nonfiction books at their instructional level, to facilitate reading proficiency, as they are learning to read.

Meaning is central to the process of reading. Selecting texts that children can read above 90% accuracy is fundamental if children are to comprehend and construct meaning from the nonfiction books they are reading. "Comprehension is very dependent on the difficulty level of the text" (Clay, 2002, p. 61). If a text is too hard a child may resort to using only one source of information, such as letter or word level knowledge, to solve unknown words; attention is directed towards letters or words, not the message contained in the print. Parallel processing is evident by the simultaneous direction of attention proficient readers apply to understand printed language. Young children read the nonfiction texts with mostly correct reading and meaningful approximations. Correct

responding is admirable, but *the importance of meaningful approximations should not be overlooked*. Meaningful approximations indicate that attention is directed towards meaning in order to comprehend the printed message. The children responded to pages where words were meaningfully substituted; signifying that early readers are able to comprehend the nonfiction texts they read; the texts were readable. When attention is free from excessive problem solving it is free to attend to the message contained in the text; comprehension takes place.

Readability influences comprehension. The children in this study responded most often to places in the books where parallel processing occurred. These early readers were able to comprehend the nonfiction books they read within large amounts of meaning driven reading characterized by parallel processing, resulting in correct responding and meaningful errors. Educators are obliged to offer children instruction using nonfiction texts that are readable to facilitate comprehending and make it possible for children to learn to read as they read to learn.

Take Notice of What Children Can Do On Their Own

The children in this study confirmed and extended known knowledge independently; they designated and extended new knowledge independently. The designation and extension of new knowledge is particularly pertinent. Although a topic may actually have been previously known to a child, the response indicates that attention was directed towards the message conveyed in the text. The children made connections to facilitate new learning that was influenced by mostly meaningful reading. Knowledge was refined with minimal assistance from me. The children made connections with

the pictures and diagrams presented in the books and/or their personal experiences. They made connections, on their own, that lead to a refinement of knowledge. The connections were made without prompting from me; my questions and comments were not designed to guide them in a specific direction.

The children in this study used the visual features of the books as connections or links to refine knowledge. Observing and noting the challenges children face as they read nonfiction materials will enable teachers to generate instruction specifically addressed to meet the needs of individuals or groups within the classroom. Are the visual and access features a source of support or do they cause confusion? How are the children using illustrations, photographs, timelines, and diagrams? How are the children using the table of contents, inserts, indexes, and glossaries? Instruction may be designed to help children develop ways to use the features in nonfiction texts efficiently and effectively to learn about and from print.

After reading, the children in this study made connections between personal experiences and the topics presented in the nonfiction books. The connections made with personal experiences facilitated learning; knowledge was enhanced and awareness heightened; knowledge was confirmed or verified. I did not ask or prompt the children to specifically relate personal experiences, nor did I engage in conversation to steer them in that direction.

Teachers can make a difference in children's learning; teachers can influence the reading process (R. B. Ruddell, 1994; Ruddell & Unrau, 1994). Learning is a social construction (Bruner, 1977); language facilitates learning (Vygotsky, 1978). In the social

context of schools, learning is constructed by the members of the classroom community (Ruddell & Unrau, 1994). “Spoken language is the medium by which much teaching takes place” (Cazden, 2001, p. 2). Teachers may use conversations with students before and after reading as a means to help them make connections that will extend and enhance known and new learning. Conversations with children, before, during, and after reading may be used as vehicles to help children construct meaning through connections made with a particular text to personal experiences, other texts, and the text itself.

Nonfiction Book Introductions: Take Notice

Book introductions are fundamental to children’s ability to read and understand the texts they are expected to read (Fountas & Pinnell, 1996). Implications from this research suggest that teachers preview nonfiction materials carefully before introducing them to students and tailor book introductions accordingly to minimize possible confusions that may arise. A teacher’s comments before reading may cause confusions later on. I stated that butterflies lay eggs during the introduction to What Lays Eggs? (Gracestone, 1998), after reading Erica pointed to a moth, saying “butterflies.” My comment was misleading. Children may relate confusions during prereading conversations. Listening carefully to their conversation to clear up confusions before reading may more effectively increase children’s ability to understand the topics presented in nonfiction texts.

Nonfiction: Provide Professional Development

The following suggestions for professional development are intended to familiarize teachers with methods and practices designed to help young children develop expertise as readers of nonfiction.

1. Recording observations provides teachers with information about what children are attending to as they read. Activities devised to sharpen observational skills will enable teachers to implement instruction designed to meet the specific needs of their students, thereby facilitating expertise with nonfiction genres.
2. Training teachers how to record, score, and analyze running records will enable them to select instructional level, readable texts for their students during guided reading lessons. Analysis of oral reading behaviors provides insights as to what children are attending to when reading and may be used as a guide to shape instruction.
3. Opportunities specifically designed to familiarize teachers with comprehension strategies that are most effective for beginning readers of nonfiction texts will enable teachers to help their young children understand the content presented in informational materials.
4. Practice with effective methods of introducing a variety of nonfiction genres will equip teachers with ways to facilitate children's understanding of the texts they are expected to read.

Future Research

This study explored how children process information and comprehend the content presented in nonfiction texts. As the data were collected, organized, and analyzed

new questions arose that led to suggestions for future research intended to enhance and extend the knowledge base regarding children's nonfiction genre development.

1. This study explored children's reading in one specific time frame. Longitudinal research exploring change over time in children's development as readers of nonfiction texts will provide insights for instruction in the early years of schooling. What new challenges do children face as they are learning to read and reading to learn during the primary years? How does the use of nonfiction genres early on prepare them for their later years in school?

2. The effects of scaffolding to extend children's nonfiction proficiencies was beyond the scope of this study. Scaffolding is a metaphor referring to the assistance given to a child by an adult to complete a task that would be unattainable by the child's own efforts. The assistance is designed to facilitate mental change that nudges a child to the next level of functioning (Wood et al., 1976). The children in this study related knowledge without scaffolding assistance from me. What influences would scaffolding have on children's learning from nonfiction texts?

3. Literacy learning is social, meaning is constructed as children preview, read and subsequently discuss the books they have read with others. The children in this study conversed and read with me individually; the sessions were not conducted in the classroom. What is the nature of children's corresponding in guided reading groups? How does conversation with the teacher and their peers influence the construction of meaning?

4. Early readers developing reading and writing proficiency within or above the average range in their classrooms were selected to participate in this study. Nonfiction texts have been shown to be the “catalyst for literacy development” for two children struggling with literacy (Caswell & Duke, 1998). What challenges do struggling readers face while reading and comprehending informational materials? What facilitates processing and comprehension when struggling readers read nonfiction texts?

5. Although culturally diverse, the children in this study were from middle-class families, living in suburban neighborhoods. Research with children from diverse socioeconomic backgrounds and geographic regions will add to the body of knowledge regarding young children reading and comprehending nonfiction texts. What facilitates processing and comprehending nonfiction texts? What particular difficulties are observed as the children read and comprehend the content presented in nonfiction materials?

6. This study focused primarily on children’s oral responses to nonfiction books. Investigation into nonverbal gestures or written responses would provide insights into additional connections children make to facilitate comprehension of nonfiction texts.

Chapter Summary

We live in a literate society, abundant with informational materials. As children progress through school they are required to read and write increasing numbers of informational texts to prepare them for the years following formal education. Success in the working world is typically dependent on the ability to speak, read and write efficiently and effectively in a variety of genres.

The young children in this study were early readers in their first year of school, just learning how to read, therefore their experiences as actual readers of nonfiction were limited. The children read and responded to the nonfiction books with minimal assistance from me. They were independent active constructors of meaning before, during, and after reading the nonfiction books; they demonstrated the ability to learn to read *and* read to learn. Exposure to an abundant assortment and variety of informational texts, early on, may facilitate the development of expertise with the genres young children read and enjoy.

I like to learn something about
owls. That An Owl, That's Who because
I've never seen one of these books
like, like, like, the bat one and now this
one, cuz I never seen one of these
books. And these books remind
me of like a special book.

Erica

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APPENDICES

APPENDIX A

Permission to Conduct Study

Note:

Note: The original title was revised. The consent documents in the appendices refer to the original title which changed during the writing process. “Observations and Conversations: Constructing a grounded theory of early readers and nonfiction texts”, is designated in the following consent documents as, “Reading Processes Used by Early Readers to Comprehend Informational Texts”.

Dear

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Norrie Eure

September 3, 2003

Deputy Superintendent - Educational Services

Dear :

I am currently a doctoral candidate enrolled in the Reading Department at Texas Woman's University, working on my doctoral dissertation. The purpose of the study is to discover how beginning readers in kindergarten understand new information when they read nonfiction books. As children progress through school and into the work force, they are expected to read and write primarily informational texts. Knowledge of how children read and comprehend informational texts will help educators provide instruction designed to facilitate development and proficiency with informational genres.

The research in this qualitative study will take place in November. After a brief introductory session I will meet with each child in four audio and video taped sessions lasting approximately 30 minutes each. Sessions will be scheduled at times that offer the least disruption with daily classroom routines. The total time missed from the classroom should not exceed 2 ½ hours. My role as a researcher will not interfere with my job related responsibilities.

I would appreciate your approval to conduct this research in ISD. After your consent, I will seek approval to conduct the study from principals and kindergarten teachers in two of the district's elementary schools. Consent letters to the parents will follow. Information about the children will be kept completely confidential. A written consent form that must be received from the parents/guardians granting permission for their children to participate is attached.

The members of my doctoral committee endorsed the dissertation proposal and recommended that I proceed with research. An approval letter on district letterhead must be submitted with the application to the Institutional Review Board at TWU.

A prospectus of the dissertation research is attached. Please let me know if you require any other documentation.

Thank you for your consideration.

Sincerely,

September 19, 2003

Dr. Nancy Anderson,
Texas Woman's University
Denton, TX

Dear Dr. Anderson,

School District has given approval for Norrie Eure to conduct a dissertation study titled "Reading Processes Used by Early Readers to Comprehend Informational Texts" in two of the district's elementary schools. The appropriate documentation was presented and reviewed prior to formal approval.

Respectfully,

Deputy Superintendent



Institutional Review Board
Office of Research and Sponsored Programs
P O Box 425619 Denton, TX 76204 5619
940-898-3378 Fax 940-898-3416
e-mail IRB@twu.edu

October 16, 2003

Dear Ms. Eure:

Re: Reading Processes Used by Early Readers to Comprehend Informational Texts

The above referenced study has been reviewed by the TWU Institutional Review Board (IRB) and appears to meet our requirements for the protection of individuals' rights.

If applicable, agency approval letters must be submitted to the IRB upon receipt PRIOR to any data collection at that agency. A copy of the approved consent form with the IRB approval stamp and a copy of the annual/final report are enclosed. Please use the consent form with the most recent approval date stamp when obtaining consent from your participants. The signed consent forms and final report must be filed with the Institutional Review Board at the completion of the study.

This approval is valid one year from October 03, 2003. According to regulations from the Department of Health and Human Services, another review by the IRB is required if your project changes in any way. If you have any questions, feel free to call the TWU Institutional Review Board.

Sincerely,

A handwritten signature in black ink, appearing to read "Linda Rubin".

Dr. Linda Rubin, Chair
Institutional Review Board - Denton

enc.

cc. Dr. Cathy Zeek, Department of Reading
Dr. Nancy Anderson, Department of Reading
Graduate School

**TEXAS WOMAN'S UNIVERSITY
CONSENT TO PARTICIPATE IN RESEARCH**

Title: **Reading Processes Used by Early Readers to Comprehend Informational Texts**

Investigator: **Norrie Eure, MSEd** 817-358-4860 ex.2127 norrie.eure@gcisd.net

Advisor: **Nancy Anderson, Ph.D.** 940-898-2235

PARENTAL CONSENT FORM

A dissertation study is being conducted, by this researcher, to learn more about how young children read and understand informational texts. The purpose of this study is to discover the reading behaviors beginning readers use as they read nonfiction books. The information gathered in this study will enable teachers to develop and improve instructional practices that effectively teach children how to read nonfiction books.

The research will take place beginning in November 2003 at your child's school. After a brief introductory meeting, your child will meet with the researcher on four consecutive days for approximately 30 minutes each day. During the first session your child will read aloud from a series of short storybooks. During the following three sessions your child will read a nonfiction book orally. A brief conversation about the book's topic will be held both before and after your child has read. The total time missed from the classroom should not exceed 2 ½ hours. The researcher will take handwritten notes and audio recordings, and video recordings. Transcriptions from the recordings will be used to confirm the accuracy of the written notes.

Your child's participation in this study is confidential. Confidentiality will be protected to the extent that is allowed by the law. The researcher will make every effort to ensure that your child is protected from risks. Your child's real name will be replaced with a code name on all written and taped documents. If your child's name is recorded on the audio tapes it will not be written in the transcription. To ensure confidentiality, all of the written documents and tapes will be stored in a locked file cabinet in the researcher's home. The researcher will have sole access to the tapes. They will be viewed only by the researcher or possibly the advisor. The researcher will be responsible for destroying the data. Written documents will be shredded. The tapes will be removed from the cassettes and cut apart.

The researcher will consult with your child's teacher to arrange the reading sessions so that minimal time is lost from classroom instruction and that disruption in daily routines is minimal. If there is a concern about loss of instructional time, an option will be offered to schedule the sessions before or after school. The sessions will take place in an unoccupied classroom in your child's school. Each session will begin with a few minutes of casual conversation designed to put your child at ease. The procedures for reading the books are similar to methods used in your child's classroom; they are common practices used with beginning readers. Books will be selected at a level that your child

Initials of parent/guardian
Page 1

Approved by the
Texas Woman's University
Institutional Review Board
October 3, 2003

should be able to read successfully with minimal difficulty. If your child seems fatigued or uneasy the researcher will offer the child the opportunity to take a break or return to the classroom.

There are no direct benefits to the participants in the study. However, your child might learn new information as the nonfiction book is being read.

Your child's participation in this study is voluntary and you may withdraw your child from the study at any time without prejudice or penalty. Information obtained during the reading sessions will not affect your child's academic standing and will not be entered on your child's academic records.

It is anticipated that the results of this study will be published in a doctoral dissertation, other research publications and professional presentations. The school district will receive a copy of the dissertation. Your child's classroom teacher and principal will receive a general report summarizing the findings.

The researchers will try to prevent any problem that could happen because your child is taking part in this research. You should let the researchers know at once if there is a problem and they will help you. However, TWU does not provide medical services or financial assistance for injuries that might happen because you are taking part in this research.

A meeting will be scheduled with the researcher to discuss any concerns you may have regarding the research. Please return the signed consent form to your child's classroom teacher if you give permission for your child to participate. You will be given a copy of this signed and dated consent form to keep. If you have any questions regarding this research study you should ask the researchers; their phone numbers are at the top of this form. If you have questions about your child's rights as a participant in this research or the way the study has been conducted, you may contact the Texas Woman's University Office of Research and Grants at 940-898-3375 or via e-mail at IRB@twu.edu.

Permission for participation:

Name of student

Signature of Parent/Guardian

Date:

Check here if you do wish to receive a general report of the findings.
Please provide your address below. The summary will be mailed to you when the study is completed.

Approved by the
Texas Woman's University
Institutional Review Board
October 3, 2003

APPENDIX B

Written Communication with Parents and Teachers

Teachers

READING PROCESSES USED BY EARLY READERS TO COMPREHEND INFORMATIONAL TEXTS

The purpose of the study is to discover:

- 1) How do early readers process information while reading nonfiction texts?
- 2) What do children's responses reveal about comprehending nonfiction texts?

Teacher procedures:

Students of the first two teachers to consent will be considered as participants in the study. The teachers will be asked to complete an alternate ranking of students based on their reading and writing ability based on:

- ♦ observation of literacy behaviors
- ♦ characteristics of early readers outlined by Fountas & Pinnell (see attached)
- ♦ classroom assessments

Participants: The first five children who return consent forms. Consent forms will be sent home October 20.

Data Collection: November - December 2003

Schedule: Each child will be seen for five consecutive days in sessions lasting no more than 30 minutes.

Session 1 – Introductory meeting; explain the purpose of the study.

Session 2 – Obtain instructional reading level.

Sessions 3-5 – Reading response sessions. Format includes:

- ♦ Book introduction
- ♦ Child previews the book
- ♦ Child reads the book orally
- ♦ Follow up conversation

Consultation with participating teachers will ensure that sessions are scheduled so that minimal time is lost from classroom instruction.

Participating teachers will receive a report summarizing the results of the study.

Thank you for your consideration.

Permission for your students to participate in this study is voluntary.

Dissertation Research – BEGINNING READERS READING NONFICTION

The purpose of the study is to discover the reading behaviors beginning readers use as they read nonfiction books.

Two questions will be addressed:

- 1) How do early readers process information while reading nonfiction texts?
- 2) What do children's responses reveal about comprehending nonfiction texts?

Selection procedures:

- ♦ Your child's teacher will be asked to select approximately 10 students who are able to read books designed for beginning readers, with moderate support from the teacher.
- ♦ The first five children who return consent forms will be selected to participate.

Schedule: Each child will be seen for five consecutive days in sessions lasting no more than 30 minutes.

Session 1 – Introductory meeting; explain the purpose of the study.

Session 2 – Child reads a series of short storybooks orally.

Sessions 3-5 – Reading response sessions. Format includes:

- ♦ Book introduction
- ♦ Book preview
- ♦ Child reads the book orally
- ♦ Follow up conversation

I will consult with participating teachers to schedule sessions so that minimal time is lost from classroom instruction.

Parents will receive a report summarizing the results of the study if desired.

Please feel free to call or email me should you have any questions or concerns about the research.

Permission for your child to participate is voluntary.

APPENDIX C
Running Record Sheet

RUNNING RECORD SHEET

Name: _____ Date: _____ D. of B.: _____ Age: _____ yrs _____ mths

School: _____ Recorder: _____

Text Titles	Errors Running Words	Error Ratio	Accuracy Rate	Self-correction Ratio
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Easy	_____	1: _____	% _____
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Instructional	_____	1: _____	% _____
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Hard	_____	1: _____	% _____
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Directional movement _____

Analysis of Errors and Self-corrections

Information used or neglected [Meaning (M), Structure or Syntax (S), Visual (V)]

Easy	_____
------	-------

Instructional	_____
---------------	-------

Hard	_____
------	-------

Cross-checking on information (Note that this behaviour changes over time)

Page	Title	Count		Analysis of Errors and Self-corrections	
		E	SC	Information used	
				M	V

APPENDIX D
Reading Response Session Nonfiction Books

Reading Response Session Nonfiction Books

- Gracestone, K. (1997). *We Ski*. Denver, CO: Shortland Publications.
- Gracestone, K. (1998). *What Lays Eggs?* Denver, CO: Shortland Publications.
- Leigh, A. (2002). *An Owl, That's Who!* New York: The Rosen Publishing Group, Inc.
- Nowak, J. (2002). *Time for Bed*. New York: The Rosen Publishing Group, Inc.
- Olearczyk, E. A. (2001). *Bats, Bats, Bats*. New York: The Rosen Publishing Group, Inc.
- Pettitt, J. (2000). *Time for Play*. Barrington, IL: Rigby.
- Stango, D. E. (2001). *Our Farm*. New York: The Rosen Publishing Group.
- Waters, J. P.-W., Mary. (1997). *Strings*. Denver, CO: Shortland Publications.
- Williams, T. P.-R., Jeff. (1997). *Before I Go to School*. Denver, CO: Shortland, Publications.

APPENDIX E

Erica's Reading Response Session

Erica Reading Response Session Transcription

What Lays Eggs?

R – Researcher

C – Child

() – Child's actions

Introduction

R – All right well I have another book today. This is called What Lays Eggs? and this is an information book just like the other ones and information books tell us about things. And before I read an information book I like to think about what the book might be about because that can help me when I'm reading to learn something new. So I know that many animals lay eggs. Mosquitoes and butterflies are some animals I know that lay eggs. What are some animals you know that lay eggs?

C – Birds, turtles, snakes even even like ducks can lay eggs. You know what there is something really strange about about that birds, that tur- that snakes, are laying eggs. That uh how come, that if um, if snakes if snakes lay eggs but, the but their bodies just close up (brought hands together) how could they lay their eggs if the snakes' body are closed up, cuz if you open it the I know they can open and lay eggs but sometimes that that snakes don't really have any baby eggs if they don't find a husband like a husb- like a boy snake.

R – So you are thinking about the topic of this book.

What are some other animals that you know that might lay eggs?

C – (no book) Um turtles might or maybe butterflies, or grasshoppers or kind little bugs even like bears can lay eggs but I don't think they can so I'll go ahead and look at the pictures.

R – Are there any other animals you can think of before you read that might lay eggs?

C – These can lay eggs. (pointed to cover) Do you know what they're called?

R – Looks like, I'm not sure.

That's a good question, I'm not sure maybe you'll find out.

Preview

R – I can tell that you want to get started and take a look through before you read it.

C – I've seen one of these on Miss Spencer's book (bird on the cover).

Oh I forgot to tell you one more thing. Frogs can even lay eggs. (p. 2)

Eggs come from many different places they come from different countries and many different animals fishes or sharks or snails, any kind of any kind of animals, animals can lay eggs or caterpillars can or roosters can or chickens can, I think that's all. (She named the animals as she flipped through the pages)

Text Reading

R - Ok. This book is called What Lays Eggs? You can go ahead and read what lays eggs to find out about those many animals that lay eggs.

Page 2

C - Mommy animals lay eggs.

Page 4

C - Snakes, snakes, snakes lay eggs.

(pointed to picture) They're kind of cute.

Page 5

C - Mommy snakes look af af-t-er and the /t/ if you put the /er/ and the /t/ /er/, /er/, /er/, so I think it's called

R - after

C - after, the-ir, the (hesitated) eggs

Page 6

C - Fish lay eggs.

Page 7

C - Mommy, m-ost, must fish do not look after the/they eggs.

Page 8

C - Snails lay eggs.

Page 9

C - Snails do not look after they eggs.

Page 10

C - mouth m-o, I wonder what that's called,

R- mosquitoes

C - mosquitoes, I know what they're called I kind of forgot.

Mosquitoes lay eggs.

Page 11

C - Mosquitoes do not look after they eggs.

C - Chickens lay eggs too.

After Reading Interview

R - Tell me what do you think about that book What Lays Eggs?

C - I learned about that um, that eggs can come from many different countries that animals lay them and many more different countries like Colorado or Massachusetts or, or they can even lay eggs in South America or Florida – any kind of countries.

R - Tell me what was new to you.

C - Um, well I noticed that, that I didn't know that these were mosquitoes (p.10). I know what they are called I just kind of forgot it and um that that worms and many kind of animals can lay many different eggs, like they can lay white eggs or shiny bright eggs like those (p. 9) or can even make blue eggs (cover) that the eggs, that the eggs aren't supposed to be blue they're supposed to be white. And snails can even, their eggs can come from their body to down for, for, for the eggs to come out of their bodies to the eggs to crack open.

R - Is there anything else that was new to you?

C - Yes. and um that crickets and one of these can even lay eggs frogs, crabs, butterflies, snakes, fishes, snails, mosquitoes, worms, chickens and that's all (turned to corresponding pages in sequence).

R - I have one other question I'd like to ask you. Is there anything else that you would like to know about animals laying eggs?

C - Well any different kind of animals that doesn't lay eggs that means that they didn't find a husband yet and also if they did their their um eggs can come from here to there all the way down until the eggs crack open. See look (p.8) like hey see (points to baby snake coming out of the egg) like see like the, the, the baby snakes like the baby, like the baby snake is cracking open that bubble is because that blowing on 'im, because, because, because its trying to, and also that fishes can lay eggs from many different ponds or, or different lakes or different, or different like Florida or Massachusetts or Colorado or any kind of different kind of country can lay eggs from different animals.

Introduction			
Location in Book	With/without Book	Transcript	Topic
2 text	researcher without	So I know that many animals lay eggs.	many animals lay eggs
10 T	researcher without	Mosquitoes	mosquitoes lay eggs
outside related	researcher without	and butterflies are some animals I know that lay eggs.	butterflies lay eggs
	without	Birds	birds lay eggs
3 picture	without	turtles	turtles lay eggs
4 text	without	snakes	snakes lay eggs
	without	even even like ducks can lay eggs.	ducks lay eggs
	without	You know what there is something really strange about about that birds that tur- that snakes are laying eggs. That uh how come that if um if snakes if snakes lay eggs but the but their bodies just close up how could they lay their eggs if the snakes body are closed up cuz if you open it the I know they can open and lay eggs but sometimes that that snakes don't really have any baby eggs if they don't find a husband like a husb- like a boy snake.	how snakes lay eggs mates
3 picture	without	Um turtles might	turtles lay eggs
	without	or maybe butterflies	butterflies lay eggs
	without	or grasshoppers	grasshoppers lay eggs
	without	or kind little bugs	bugs lay eggs
	without	even like bears can lay eggs but I don't think they can so I'll go ahead and look at the pictures.	bears - possibly?
	cover	These can lay eggs. Do you know what they're called?	
	researcher	Looks like, I'm not sure. That's a good question; I'm not sure maybe you'll find out.	

What Lays Eggs?

Preview			
Page	Action	Transcript	Known
cover picture	cover	I've seen one of these on Miss Spencer's book (bird on the cover)	birds lay eggs
2 picture	2	Oh I forgot to tell you one more thing. Frogs can even lay eggs.	frogs lay eggs
		Eggs come from many different places they come from different countries	eggs come from different places
2 text	3	and many different animals	different animals
6 text	4	fishes or sharks	fish lay eggs
8 text	6	or snails	snails lay eggs
2 text	10	any kind of any kind of animals animals can lay eggs	many different animals lay eggs
	11	or caterpillars can	caterpillars lay eggs
12 text	12	or roosters can or chickens can	roosters, chickens lay eggs
		I think that's all.	

RUNNING RECORD SHEET

Name: Erica

Date: _____ D. of B.: _____ Age: _____ yrs _____ mths

School: _____ Recorder: _____

Text Titles	Errors Running Words	Error Ratio	Accuracy Rate	Self-correction Ratio
Easy		1:	_____ %	1: _____
Instructional		1:	_____ %	1: _____
Hard	<u>What Lays Eggs (4)</u>	10/53	1: 5.3 80 %	1: _____

Directional movement _____

Analysis of Errors and Self-corrections

Information used or neglected [Meaning (M), Structure or Syntax (S), Visual (V)]

Easy Erica searched for (M) (S): initial clusters & some
 Instructional readings. She searched few (S) to solve
 unknown words. She frequently reflected to
 Hand (C) search for (S). Erica's reading was phrased
 & fluent.

Cross-checking on information (Note that this behaviour changes over time)

Page	Title	Count	Analysis of Errors and Self-corrections	
			E MSV	SC MSV
2	<u>What Lays Eggs</u> 6/53	10		
2	<u>money</u> ✓ ✓ ✓ (P) <u>Many</u>	1	(M) (S) (V) as others	
4	VR ₂ (+P) ✓ ✓			
5	(P) <u>money</u> ✓ ✓ <u>af/af-t/ee</u> <u>many</u> after and the t if you put the er and the t/er-er-er/ "so I think its called" /T/R <u>the-er/the</u> ✓ <u>ther</u>	2	(M) (S) (V) as new MSV	
		1	(M) (S) (V) unclear	

Analysis of Errors
and Self-corrections

Page		Count		Information used
		E	SC	
6	(P) vvv			
7	<u>monday</u> for-a-st/must most	1		(P) S V ^{answ}
	v v v v v the/they ✓ their	1		(P) S V ^{clue}
8	vvv			
9	v v v v v			
	<u>they</u> ✓ their	1		(P) S V ^{clue}
10	<u>mosch/on-o/</u> "I wonder what mosquitos that's called" /R v v " I know what they're called I just kind of forgot "	1		M S V
	v v v v v <u>they</u> ✓ their	1		(P) S V ^{clue}
12	v v v v v			
13	v R ₂ v v <u>they</u> ✓ their	1		(P) S V ^{clue}

Processing

Erica

What Lays Eggs?

Accuracy 80%

Self-Corr. None

Processing

Location in Book	Pictures	Reading Behavior	Type of Word	Word	Initial Source of Information	Final Source of Information	Reading Quality	Type of Processing	Notes
Cover	4 blue speckled eggs in a nest inserts of 5 different egg layers - snail, ants, crocodile, grouse, insect								
Title Page	grasshopper and larvae								
2	frog	Mommy animals lay eggs. (QLAP) Many animals lay eggs.	other	most		M S V	meaningful approximation	parallel	
3	crab, turtle, moth on their eggs								
4	snake	Snakes, snakes, snakes. (LAP) lay eggs. Snakes lay eggs. "They're kind of cute."	other	lay	M	M S V	solved	successive	she could have been confirming snakes
5	diagram - different stages of snake eggs hatching	(QLAP) Mommy snakes look Most snakes look af af-i-er and the -t- if you put the -er- and the -i-er-er-er- so I think it's called after after T the -in the eggs. their eggs.	other	most	M	M S V	meaningful approximation	parallel	QLAP - not analyzed

Locaten in Book	Illustrations	Reading Behavior	Type of Word	Word	Initial Source of Information	Final Source of Information	Reading Quality	Type of Processing	Notes
			other	after	V		less productive attempt	successive	
			other	their		M S V	meaningful approximation	parallel	
6	fish	(QLAP) Fish lay eggs. Fish lay eggs.				M S V	accurate	parallel	QLAP - not analyzed
7	digaram - different stages of fish eggs hatching	Monmy m-oed. most Most fish do not look after <u>the</u> <u>they</u> eggs. fish do not look after their eggs.	other	most	M S V	M S V	meaningful approximation	successive	
			other	their	M S V	M V	meaningful approximation	successive	
8	snail	Snails lay eggs. Snails lay eggs.				M S V	accurate	parallel	
9	digaram - different stages of snail eggs hatching	Snails do not look after <u>they</u> eggs. Snails do not look after their eggs.	other	their		M V	meaningful approximation	parallel	
10	mosquito	<u>mouth</u> m-o I wonder what that's called <u>mosquitoes</u> mosquitoes T Mosquitoes lay eggs. Mosquitoes lay eggs. " I know what they're called I kind of forgot."	technical	mosqui toes	V		less productive attempt	successive	

Location in Book	Pictures	Reading Behavior	Type of Word	Word	Initial Source of Information	Final Source of Information	Reading Quality	Type of Processing	Notes
11	diagram - different stages of mosquito egg hatching	Mosquitoes do not look after <u>they</u> eggs. Mosquitoes do not look after their eggs.	other	their		M V	meaningful approximation	parallel	
12	hen and 3 baby chicks in a nest	Chickens lay eggs too. Chickens lay eggs too.				M S V	accurate	parallel	
13	baby chick and 4 eggs in a nest	Chickens chickens chickens Chickens look after <u>they</u> eggs. look after their eggs.	other	their		M V	meaningful approximation	parallel	
14	chick development inside an egg 7, 18, 20 days and hatching								
15	baby chick								
16		Index							

Note: LAP - The child looked at the picture; the behavior appeared to be a deliberate attempt to solve the word.

QLAP - The child glanced at the picture as the page was being turned; the behavior appeared to be automatic.

After Reading Interview								
Location in Book	Transcript	Topic	Familiarity	Knowledge Refined	Responding Behavior	With/without Book	Reading Quality	Notes
outside related	I learned about that um that eggs can come from many different countries that animals lay them and many more different countries like Colorado or Massachusetts or or they can even lay eggs in South America or Florida - any kind of countries.	animals lay eggs in different places	child	extend	self	without	does not apply	her grandfather was in Colorado
10 text picture	Um well I noticed that that I didn't know that these were mosquitoes. I know what they are called I just kind of forgot it	mosquitoes	researcher	confirm	picture	10	less productive attempt	
11 picture	and um that that worms	worms lay eggs	other	designate	picture	11	meaningful approximation	mosquito larvae? misunderstand
11 picture	and many kind of animals can lay many different eggs .	many animals lay eggs	researcher	confirm	picture	11	meaningful approximation	
9 picture	like they can lay white eggs or shiny bright eggs like those	different kinds of eggs	child	extend	picture	9	meaningful approximation	
cover picture	or can even make blue eggs (cover) that the eggs that the eggs aren't supposed to be blue they're supposed to be white.	different kinds of eggs	child	extend	picture	cover	does not apply	
8 picture	And snails can even their eggs can come from their body to down for for the eggs to come out of their bodies to the eggs to crack open	snail eggs hatch	child	extend	picture	8 picture	accurate	inference
title page picture	Yes. and um that crickets	crickets lay eggs	other	designate	picture	title page picture	does not apply	praying mantis misunderstand
title page picture	and one of these can even lay eggs		other	designate	picture	title page picture	does not apply	larvae misunderstand

Conversations After Reading (Continued)

270

Location in Book	Transcript	Topic	Familiarity	Knowledge Refined	Responding Behavior	With/Without Book	Reading Quality	Notes
2 picture	frogs	frogs lay eggs	child	confirm	picture	2 picture	meaningful approximation	illustration depicts
3 picture	crabs	crabs lay eggs	new	designate	picture	3 picture	meaningful approximation	illustration depicts
outside related	butterflies	butterflies lay eggs	other		picture	3	meaningful approximation	moth in illustration misunderstand
4 text picture	snakes	snakes lay eggs	child	confirm	picture	4	solved	
6 text picture	fishes	fish lay eggs	child	confirm	picture	6	accurate	
8 text picture	snails	snails lay eggs	child	confirm	picture	8	accurate	
10 text picture	mosquitoes	mosquitoes lay eggs	researcher	confirm	picture	10	less productive attempt	
outside related	worms		other	designate	picture	11 picture	meaningful approximation	mosquito larvae misunderstand
12 text picture	chickens	chickens lay eggs	child	confirm	picture	12	accurate	
	and that's all							
outside related	Well any different kind of animals that doesn't lay eggs that means that they didn't find a husband yet	different/many animals lay eggs	child	confirm	self	without	does not apply	
8	and also if they did their um eggs can come from here to there all the way down until the eggs crack open.	snail eggs hatch	child	extend	picture	8 picture	accurate	inference
5 picture	see look like hey see (points to baby snake coming out of the egg) like see like the the baby snakes like the baby like the baby snake is cracking open that bubble is because that blowing on 'im because because because its trying to	snake eggs hatch	new	extend	picture	5 picture	varied	meaningful approximation less productive attempt inference

Conversation After Reading (Continued)

Location in Book	Transcript	Topic	Familiarity	Knowledge Refined	Responding Behavior	With/without Book	Reading Quality	Notes
outside related	and also that fishes can lay eggs from many different ponds or or different lakes	fish lay eggs in water	child	extend	self	without	does not apply	
outside related	or different or different like Florida or Massachusetts or Colorado or any any kind of different kind of country can lay eggs from different animals.	animals lay eggs in different places	child	confirm	self	without	does not apply	
outside related	or different or different like Florida or Massachusetts or Colorado or any any kind of different kind of country can lay eggs from different animals.	animals lay eggs in different places	child	confirm	self	without	does not apply	

APPENDIX F

Processing and Comprehending Association

Confirm Known**Processing and Comprehending Association**

	Child	Researcher	Total	With Book	Without Book	Notes
				Picture	Self and Picture	Self
Accurate Reading						
Solved						
Self-corrected						
Meaningful Approximation						
Approximation Neglected Meaning						
Less Productive Approximation						
Addition						
Varied						
Does Not Apply						
Total						

Note: Another table was made for Extending Known Knowledge

Designate New**Processing and Comprehending Association**

	With Book		Without Book		Total
	Picture	Personal Experience and Picture	Personal Experience	Unsure	
Accurate Reading					
Solved					
Self-corrected					
Meaningful Approximation					
Approximation Neglected Meaning					
Less Productive Approximation					
Addition					
Varied					
Does Not Apply					
Total					

Note: Another table was made for Extending New Knowledge