AN EXPLORATORY STUDY OF THE RELATIONSHIP BETWEEN CURiosity AND PRINT AWARENESS OF FOUR-YEAR-OLD CHILDREN

DISSERTATION

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By

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This study has five chapters, organized in the following manner: (1) Chapter I contains the introduction, statement of the problem, purpose of the study, questions, significance of the study, and definition of terms; (2) Chapter II is a review of the literature; (3) Chapter III is a description of subjects and tests and procedures for treating the data; (4) Chapter IV contains the statistical technique of the analysis and the findings related to the questions, and (5) Chapter V consists of the summary, findings, conclusions, and recommendations.

The problem of the study was to explore the relationship between curiosity and print awareness among four-year-old children. Subjects participating in the study were 71 four-year-old children from six licensed child care and preschool settings located in different geographical sections of a north central Texas city. The study included thirty-four girls and thirty-seven boys. Instruments used to collect the data were Kreitler, Zigler, and Kreitler’s battery of curiosity tasks and Goodman’s Signs of the Environment and Book Handling Knowledge tasks. Canonical
correlation analyses do not yield a significant relationship between variables of curiosity and print awareness. An alternate Pearson Product Moment correlation yielded some specific pairwise correlations between certain curiosity variables and print awareness. Results, although not statistically significant, were used as trend indicators to identify areas worthy of further investigation. On the basis of the findings, it was concluded that the possibility of a degree of correlation between specific curiosity variables and levels of print awareness suggests the need for further research in this area. In the print awareness tasks, it was concluded that the more context available to children the greater their ability to respond appropriately to print. Knowledge of print in the environment was more advanced than knowledge of print in books for some of the children in the study.
# TABLE OF CONTENTS

## LIST OF TABLES

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
</tr>
</tbody>
</table>

## Chapter

### I. INTRODUCTION

- Statement of the Problem
- Purpose of the Study
- Research Questions
- Significance of the Study
- Definition of Terms

### II. REVIEW OF THE LITERATURE

- Children Who Learned to Read Naturally
- Environmental Print Knowledge
- Curiosity

### III. METHODS AND PROCEDURES OF THE STUDY

- Selection of the Sample
- Instrumentation
- Description of Tasks of Curiosity
- Collection of the Data
- Analysis of the Data

### IV. RESULTS OF THE STUDY

- Data Related to Curiosity Measure
- Data Related to Research Questions
- Discussion of Results by Measure
- Discussion Related to Research Questions

### V. SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

- Summary
- Findings
- Conclusions
- Recommendations
APPENDICES

A. CURIOSITY MEASURE .............................................. 76
B. PRINT AWARENESS MEASURES ................................. 91
C. LETTERS TO PARENTS AND DIRECTORS .................. 99
D. PERMISSION LETTERS ........................................... 104

REFERENCES .................................................................. 108
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mean Frequencies and Standard Deviations of Variables by Age</td>
<td>46</td>
</tr>
<tr>
<td>2.</td>
<td>Number of Children Selecting New and Partially Familiar Toys: Variable X</td>
<td>49</td>
</tr>
<tr>
<td>3.</td>
<td>Responses of All Subjects to Level 1</td>
<td>50</td>
</tr>
<tr>
<td>4.</td>
<td>Responses of All Subjects to Level 2</td>
<td>50</td>
</tr>
<tr>
<td>5.</td>
<td>Responses of All Subjects to Level 3</td>
<td>51</td>
</tr>
<tr>
<td>6.</td>
<td>Responses by Age to Level 1</td>
<td>53</td>
</tr>
<tr>
<td>7.</td>
<td>Responses by Age to Level 2</td>
<td>54</td>
</tr>
<tr>
<td>8.</td>
<td>Responses by Age to Level 3</td>
<td>55</td>
</tr>
<tr>
<td>9.</td>
<td>Book Handling Knowledge Task by Age</td>
<td>56</td>
</tr>
<tr>
<td>10.</td>
<td>Mean Frequencies and Standard Deviations for Print Awareness Tasks</td>
<td>59</td>
</tr>
<tr>
<td>11.</td>
<td>Summary of Pairwise Correlations</td>
<td>69</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

Young children spend many hours investigating, manipulating, inspecting, and asking questions about the world around them. All such behaviors demonstrate the innate human characteristic of curiosity (Bradbard and Endsley 1980). Jewell and Zintz (1986) called curiosity "an ignition system for the major activity of the young—exploration" (52). Those who work with young children affirm that children are intensely curious about their world and eager to play a part in it. Young children are curious about how things work, the world of nature, an unfinished story—everything in their world. Written language is also a part of the world around them and children are also curious about and explore language as they do other unknowns. Written language becomes another object to explore and to understand.

Studies of early readers indicate that reading develops throughout the preschool years as part of young children's curiosity about and desire to make sense of print in their environment (Torrey 1969; Ferreiro and Teberosky 1982). Researchers have revealed that children develop literacy as they grow up in a literate society. Holdaway (1979)
stressed that when children observe written language being used for the "fulfillment of real-life purposes" they have started on the path to literacy. Clay (1967, 1972) stated that as soon as children ask "What does it say?," they are learning to read. They are aware of print.

Researchers have found that young children are active constructors and not passive receivers of reading and writing knowledge (Bissex 1980; Clay 1967; Durkin 1966; Goodman and Goodman 1979). Hoskisson (1977) suggests that many children construct their own knowledge and develop their own means of solving the problem of learning to read. Children often acquire considerable knowledge of what and how to read through informal experiences with written language (Mason 1980; Teale 1982). The importance of initial emphasis on the meaningfulness of printed words and messages is stressed.

According to researchers, early readers are children who ask questions about written language (Clay 1967; Durkin 1966; Sutton 1964). Torrey (1969) found that natural readers learned to read by asking the right questions. She suggested that children do not have to be gifted or come from a middle or upper economic status in order to learn to read naturally. In Torrey's study of a young boy who learned to read on his own, the availability of books and the opportunity to have his questions answered appear to have been important factors.
Smith (1976) states that "children probably begin to read from the moment they become aware of print in any meaningful way, and... roots of reading are discernible whenever children strive to make sense of print, before they are able to recognize many of the actual words" (299). These roots of reading, or roots of literacy, as Goodman (1984, 1986) calls them, provide children with the natural beginnings of literacy.

Young children are curious about their world and inferential evidence from research suggests that curiosity is a factor in young children's early interest in and awareness of print. Further study exploring a relationship between curiosity and print awareness seems warranted in order to determine whether the most curious children tend to be the most print aware.

Statement of the Problem

The problem of this study was to determine the degree of relationship between curiosity and awareness of print among four-year-old children.

Purpose of the Study

The specific purposes of this study were:

1. To measure the print awareness and curiosity behavior of four-year-old children in the sample.

2. To correlate curiosity measure scores with print awareness measure scores in order to determine the degree of
relationship which exists between curiosity and print awareness among four-year-old children.

Research Questions

In accordance with the purposes of this study, the following questions were examined:

1. Is there a relationship between curiosity and print awareness among four-year-old children?

2. Is the degree of relationship between curiosity and print awareness the same for youngest four-year olds as it is for oldest four-year olds?

Significance of the Study

The National Association for the Education of Young Children and the International Reading Association have each published position papers on the importance of developmentally appropriate curriculum for young children.

Recommendations included in such statements emphasize the following appropriate methods:

Teachers prepare the environment for children to learn through active exploration and interaction with adults, other children, and materials (National Association for the Education of Young Children 1986, 23).

Children’s natural curiosity and desire to make sense of their world are used to motivate them to become involved in learning activities (NAEYC 1986, 23).
Instruction is built on what the child already knows about oral language, reading, and writing. Focus on meaningful experiences and meaningful language rather than merely on isolated skill development (Schickedanz 1986, 137).

Encourage children to be active participants in the learning process rather than passive recipients of knowledge, by using activities that allow for experimentation with talking, listening, writing, and reading (Schickedanz 1986, 138).

These recommendations are supported by a growing body of research and theory (NAEYC 1986; Schickedanz 1986). This study adds to the information about early reading behaviors and may help parents and teachers realize the significant role they play in supporting and maintaining curiosity and print awareness in young children. Parents, teachers, and school administrators may gain more understanding of the informal means by which young children develop their knowledge about reading. The information may then be used to develop curriculum that focuses on the strengths of young children, the naturalness of their learning, and encourages their developing competencies in literacy.

Definition of Terms

For the purposes of this study, the following definitions were used:
Natural readers. Children who learn to read without formal, systematic instruction. They learn to read in much the same way and for many of the same reasons that they learned to talk (Goodman and Goodman 1979, 138).

Environmental Print. The print that occupies the everyday world in the form of labels, signs, and slogans; print outside that of regular connected discourse characteristic of books, magazines, and newspapers (Goodman 1980; Jewell and Zintz 1986, 257).

Print Awareness. Young children's reaction to print in and out of the school environment and in books, understanding the functions of print, knowledge about books and how they are read, and awareness of their responses to print (Goodman 1986).

Curiosity. Curiosity is intrinsic motivation which results from a deep desire or strong need to find something out; particularly, a compelling drive to know the peculiar, incongruous, and mysterious. This motive directs and sustains purposive, problem-solving, behavior which includes wondering, observing, questioning, examining, and exploring activities (Foote 1985, 13).

Manipulatory curiosity. Curiosity which is elicited by the handling of objects for the purposes of inspection or manipulatory exploration (Kreitler et al. 1975, 196).
**Perceptual curiosity.** Curiosity which is exhibited by scanning while matching, comparing, or investigating (Kreitler et al. 1975, 196).

**Conceptual curiosity.** Curiosity which is exhibited by "active information-seeking through asking questions and through extensive checking of commonly accepted concepts" (Kreitler et al. 1975, 196).

**Curiosity about the complex.** Curiosity which is exhibited by a preference for observing a complex rather than a simple stimulus (Kreitler et al. 1975, 196).

**Adjustive-reactive curiosity.** Curiosity which is exhibited when a child shows a tendency to operate toys or other objects according to their customary use and responds to the most obvious characteristics of the objects for the purpose of obtaining information (Kreitler et al. 1975, 197).

**Youngest fours.** A young four is a child between 4.0 and 4.3 years of age.

**Middle fours.** A middle four is a child between 4.4 and 4.6 years of age.

**Oldest fours.** An old four is a child between 4.7 and 4.9 years of age.
CHAPTER II

REVIEW OF THE LITERATURE

Some children, during the preschool years, apparently begin to read without any formal instruction in reading. Curiosity about print in the environment is often cited as a factor which contributes to this natural emergence into reading. Curiosity, or the desire to know, has long been noted as a quality that describes the nature of young children. Curiosity is considered an important factor in learning and researchers have found that it correlates with various aspects of development (Bradbard and Endsley 1980).

Is there a relationship between curiosity and awareness of environmental print? To begin to answer this question, literature pertinent to curiosity and print awareness are examined. This review of literature will be conducted in three parts: (1) early readers who learned to read without any direct instructions, (2) young children's awareness of print in the environment, and (3) studies of the development and nature of curiosity in children.

Children Who Learned to Read Naturally

The late Swiss psychologist, Jean Piaget, studied the intellectual development of children for many years. His findings have been an invaluable source for gaining insights
into the development and operation of a child's mind. According to Piaget, the child constructs intellectual principles and constantly reinvents his or her own organization of knowledge through the interplay of assimilation and accommodation. Piaget named this theory of cognitive development, constructivist structuralism (Sulzby 1986; Teale 1982; Foreman and Kuschner 1983). Piaget saw "knowing" as being the result of an active mind constructing relationships among objects.

Ferreiro and Teberosky (1982) state that Piaget's theory allows the introduction of written language as an object of knowledge and the learner as a thinking individual. Within the Piagetian framework, Ferreiro and Teberosky studied children's ideas about reading and writing. A total of 108 preschool and young school-aged children were interviewed on an individual basis. Ferreiro and Teberosky found that even before children know how to read text, they have distinct ideas of what can and cannot be read. The researchers conclude that children interact with a variety of print in their environment:

It is absurd to imagine that 4- or 5-year-old children growing up in an urban environment that displays print everywhere (on toys, on billboards and road signs, on their clothes, on TV) do not develop any ideas about the nature of this cultural object until they find themselves sitting before a teacher at the age of six (Ferreiro and Teberosky 1982, 12).

Plessas and Oakes (1964) examined the characteristics of twenty early readers and factors associated with their
learning environment. Based on parents' reports, Plessas and Oakes found that early readers in the study lived in homes where there were many encouraging and stimulating activities relating to reading. The children also showed an early personal interest in reading signs and asked many questions about letters, words, and numbers.

The earliest comprehensive research on early reading was done by Durkin (1959, 1966) who found that children who were early readers had been read to extensively and had storybooks of their own. They demonstrated early interest in written language on signs and labels and initiated the learning themselves by asking "What does this say?" They were children who were curious about words in books, in newspapers, on television screens, on signs and billboards and on cereal boxes and canned goods. They also had someone who was willing to satisfy their curiosity. Teale (1978) and Schickedanz (1981) also emphasized the role of significant people in the environment in answering and encouraging children's curiosity about print.

Clark (1976) conducted a study of thirty-two children who were already reading fluently when they started school. Clark, like Durkin, found that most of the children in her study had an interested adult who interacted with them in a stimulating, encouraging environment. Clark also noted that the range of printed materials was not confined only to books:
Although these early reading experiences for some of the children were in books from which they had enjoyed stories, for some of the children the print in their immediate environment played an important role. This was particularly true of the boys who showed interest in sign-posts, car names, captions on television and names on products at the supermarket (Clark 1976, 51). 

Price (1976) explored methods used by a group of gifted children in learning to read, as well as their preschool experiences related to reading. Data from a parent questionnaire revealed the following characteristics in this group of early readers: persistence in asking names of letters and words; ability to recognize words of products on television; constant exposure to books; interest in road signs and product labels; and good memories. Parents also listed instances of the children’s active imaginations, curiosity and problem-solving capacity.

Researchers have reported on single-subject case studies of children who learned to read before entering school. In one diary study, Bissex (1980) traced the patterns of her son Paul’s literacy development over a five-year period. She provided evidence that Paul learned many of his first words from familiar contexts, such as books he memorized and from non-book materials like cereal boxes, labels, and signs. She reported that Paul was an active learner who liked to experiment and find things out for himself. In another diary study, Lass (1982) observed and recorded the reading behaviors of her son, Jed, from birth to two years of age. She identified reading behaviors as
"skills with and interest in print, books or the language of literature" (22). She concludes that reading behaviors appear quite early in life, given facilitative conditions. She states that systematic instruction may be unnecessary for some skills such as a beginning sight vocabulary and interest in the message of print.

Smith (1976) described the observation of a three-year-old child who responded to print around him. The subject, Matthew, was observed in a supermarket and grocery store. Smith concluded, "My brief case study tells me that children learn a great deal about reading without adult assistance or even adult awareness" (322). Smith also noted that the child he observed was not responding to sound symbol relationships but to his own personal meaning of the words.

The subject in Reger's case study (1966) matched items in television advertisements to the actual product from several which were similar when he was somewhere between twelve and fifteen months of age. Before the boy was two and a half years old, he could read street signs and service station signs. By three years of age, he kept up with his favorite baseball team by reading the newspaper. The eighteen month old in Krippner's (1963) study also demonstrated an interest in numbers and words in his environment. "Larry became especially proficient at reading road signs when the family took Sunday afternoon drives" (105). The child was reading books by three years of age.
Often, such children are considered exceptional cases and average children are not thought to be able to perform similarly. However, Torrey (1969) reported on the reading acquisition of John, a black child from a lower socioeconomic family, who began reading naturally. Torrey believes that John was like many readers who began reading television commercials and product labels at home. Torrey states that reading is learned, not taught, and that children form their own generalizations based on their knowledge of language. Torrey was one of the first to suggest that any child, not just exceptional ones, could learn to read naturally.

According to the studies reviewed, children who read early seem to demonstrate interest in and ask questions about print. Researchers also emphasize the importance of the role that environmental print plays in young children's emergent reading abilities.

Environmental Print Knowledge

In studies of children who read early, a common characteristic of these children was their early interest in written language on signs and labels (Bissex 1980; Clark 1976; Durkin 1959, 1966; Krippner 1963). Smith (1984) emphasizes that for children who will become readers there must first be "the recognition that written language exists, that there are aspects of the visual environment worth paying attention to in a particular way" (144).
Researchers have recently conducted investigations of young children's knowledge of environmental print as a means of exploring literacy acquisition. Ylisto (1977) studied the early reading responses of sixty-two Finnish preschoolers. Photographs of printed work symbols found in the everyday world of children were arranged in a series of gradual decontextualization and shown to each child for identification. As a result of the study, Ylisto suggests that, in learning to read, children go through a step-by-step process that involves their interaction with the environment. She recommends that teachers need to be aware of learning strategies children use when they first begin the reading process. She emphasizes that "teaching letter-sound relationships is of questionable value because children must grasp the idea for themselves as their curiosity leads them to test their theories of what a word is" (172).

Following the same general procedure as Ylisto with the use of photographs, Goodall (1984) studied twenty Australian kindergarten children's ability to read environmental print. The stimuli were photographs of twenty-two words in general use in the child's environment. More than 50 percent of the children's responses to words in full environment were correct. Only 30 percent of the responses were correct in the reduced environment, and nearly 50 percent were "don't know." Goodall concluded that although preschoolers in her
study were aware that print conveys information, they were frequently using environmental cues rather than letter knowledge when they appeared to read.

Jones and Hendrickson (1970) found similar results when they examined the influence of color, written words, and total format of food labels and books on preschoolers' recognition of words on those objects. All children recognized more words in the total-format condition than in the words-only condition. The older children recognized more words out of context than the younger children. This study seems to support the idea that there are developmental levels through which children pass in learning to relate to written symbols. In studying the print awareness knowledge of 25 four- and five-year-old Spanish-English bilingual children, Romero (1983) also found that the more context available to children, the greater their ability to make appropriate responses.

Other researchers have studied children's understanding of written language as they identify words in their environment. Hiebert (1978) showed a series of slides in which ten words or letter combinations were presented both in and out of the environmental context to forty preschool children. Subjects made more errors when words were out of context than in context, and more errors were made on letter tasks than word tasks. Hiebert concluded that "young children have acquired knowledge about written language which could
be considered part of the reading process and precursors to reading skills." She added that only when print was seen in the context of its actual setting did children perceive it to be meaningful. The young and older groups did not differ significantly on the types of errors made, although younger subjects made more errors than the older ones.

In yet another study of preschool children's print awareness, Hiebert (1981) traced the development over the preschool years of children's facility on three reading readiness skills, their concepts of reading, and the interrelationships among these skills and concepts. Data indicated that knowledge of all concepts and skills increased significantly over the preschool period with five-year olds performing significantly better than three-year olds. Comparisons between adjacent age groups were less consistent. The results also depicted the various dimensions of print awareness as being integrally related.

Studies of children's print awareness include investigations by researchers who have provided an indepth analysis and a basis for understanding literacy development. Goodman and Altwerger (1981) explored preschoolers' awareness and response to environmental print, their attitudes and concepts about reading and writing, and their knowledge and familiarity with print in books. Subjects were three, four, and five years of age. Four- and five-year olds responded similarly, while the three-year olds had fewer
exact or appropriate responses. The researchers found that the older children attended better to meaning than young children, but all children attended better to meaning when print was in natural context. Children in the study were more likely to perceive isolated print as not meaningful or interesting. Goodman and Altwerger suggest that "children’s attitudes and ideas about reading are formed quite early and remain rather constant till at least five years of age" (29).

In their analysis of the development of print awareness in young children, Harste, Burke and Woodward (1982) examined strategies used by preschool children when they encounter print. Three research tasks were administered to twenty children ages three to six. As a result of their observations of children’s performances on the tasks, Harste et al. conclude that preschool children informally develop written language learning strategies and have discovered much about print prior to formal language instruction. They also state that written language, like oral language, is learned naturally from encountering written language in use.

Another body of literature about environmental print concerns the relationship between environmental print reading and formal reading acquisition. Haussler (1982) described and analyzed the relationship of print awareness to beginning reading of texts in eight children from a combination kindergarten/first-grade classroom. The
development of the children was followed for a year with data collected in the school setting. Haussler reports on strategies children use in their transitions into literacy:

Children first use personal experiences and context to gain meaning from print in the environment and in books. As they read from books, their focus narrows from using pictures, knowledge of plot, and past reading experiences to focus on print. As children discover that their transitional reading responses do not work on connected discourse, they begin to integrate reading strategies to text (Haussler 1982, 324).

In another vein, Masonheimer, Drum and Ehri (1984) examined 102 preschoolers' ability to read words when presented in environmental, logo, and isolation contexts as well as to detect letter alterations in environmental print. Prereaders identified over 80 percent of the words in the environmental context correctly, but could identify only 23 percent of these words in isolation and were able to detect only a few letter alterations. Findings indicated that younger prereaders were no more dependent upon context cues than were older prereaders. The researchers conclude that it is not age but reading skill that reduces children's dependency upon context cues for reading labels and that environmental print reading does not by itself lead to reading development.

Mason (1980) suggests that although environmental print reading may not directly lead to the development of reading ability, it may serve as a precursor to more skilled reading. Mason studied the development of four-year-old
children's knowledge of letters and printed words on environmental logos to determine when and how preschool children begin reading. Over the nine-month period of the study, children made substantial gains in word recognition strategies and letter and word knowledge. Results of the study indicate a three-level hierarchy of learning to read.

McGee (1986) provides the following information about children's environmental print reading:

At remarkably early ages children recognize the symbolic potential of environmental print; they recognize that meaning is associated with print items. They often are aware that it is the written language in the environmental print that conveys the message; they point to the written language as they read or talk about the written language when questioned about environmental print (McGee 1986, 125).

The findings of the studies reviewed in this section suggest that some children are aware of the meaningfulness of print when it is encountered within familiar, contextualized settings. In addition, researchers report that children have developed concepts about written language before formal instruction. Although it is unclear whether environmental print reading leads to formal reading acquisition, it appears that environmental print plays an important role in children's transitions into literacy.

Curiosity

Theorists hypothesize that curiosity behaviors such as exploration, asking questions, and manipulation provide a foundation for the more complex behaviors of reasoning,
problem solving, and social competence (Berlyne 1960; Erikson 1950; Piaget 1952). In recent years, an increasing number of studies on children's curiosity have been conducted. This section reviews the research significant to this study.

White (1959) emphasizes that curiosity is a means through which children master their environment. As children explore, they express their curiosity in a variety of ways because they "derive pleasure from the mastery, learning, and feelings of competence which result from their explorations" (Bradbard and Endsley 1980, 22).

Social learning theorists stress the importance of socialization agents in shaping children's curiosity behavior through modeling and providing external incentives such as praise and answers to their questions. Researchers have found that adults can influence children's curiosity behavior by being attentive, sensitive, and supportive. Maternal attentiveness and subsequent exploratory behavior in infants was time-sampled by Rubenstein (1967). At five months, three groups of babies were classified as receiving high, low, or medium maternal attentiveness. The high-attentiveness group significantly exceeded the low-attentiveness group in looking at, tactile manipulation of, and vocalizing to a novel stimulus presented alone, and exceeded both other groups in looking at and manipulating novel stimuli in preference to familiar ones.
Other studies support Rubenstein's findings that high maternal attentiveness is positively related to curiosity behavior. Saxe and Stollak (1971) report on observations of four groups of first-grade boys and their mothers. Each mother and her son were brought into a playroom containing standard playroom toys and novel objects. Mothers of curious-high prosocial boys displayed more positive feeling, fewer restrictions, and less nonattention than mothers of aggressive boys. Mother's positive feeling was also correlated with child's attentiveness, manipulation, and offering information. Child's curiosity toward novel stimuli was highly correlated with mother's novel curiosity.

In a similar observational study, Endsley, Hutcherson, Garner, and Martin (1979) examined the relationships between certain maternal interaction patterns and children's curiosity in a twenty-minute play situation. As found in the Saxe and Stollak study, the frequency with which the mothers oriented their children to explore the novel materials, responded positively to exploration, answered questions, and explored the novel materials themselves were all highly correlated with the two child-curiosity measures: exploration and questions. The more authoritarian mothers were less likely to interact positively with their children and to orient them to explore the novel materials.

Researchers also indicate that young children's exploratory and questioning behavior may be influenced
through modeling and reinforcement. Moore and Bulbulian (1976) examined the effects of contrasting styles of adult-child interactions on children's curiosity. The subjects, ten boys and ten girls, were randomly assigned to a friendly-approving (FA) condition or to an aloof-critical (AC) condition. Data indicated that:

- children in the presence of an aloof, critical adult were less likely to display incidental task-related curiosity and exploratory behavior, had longer latencies before beginning to explore, and were less inclined to venture guesses as to the identity of objects than children in the presence of a friendly, supportive adult (Moore and Bulbulian 1976, 172).

Studying the effects of a maternal model on young children's tactual curiosity, Johns and Endsley (1977) randomly assigned 48 four- to six-year-old children to one of three maternal modeling treatment groups: MC—mother exhibits tactual curiosity; MNC—mother stares ahead and exhibits no tactual curiosity; and C—mother interacts with another adult and exhibits no tactual curiosity. After the modeling phase, individual children were invited to sit at a table containing three stimulus objects similar to the ones the mother had in the modeling room. The child's imitative or non-imitative behavior was noted during this time. Imitative tactual curiosity occurred significantly more frequently among MC children.

Children's question-asking behavior is often noted as an indicator of curiosity. Endsley and Clarey (1975) hypothesized that answering young children's questions
increases the frequency with which they ask questions. The subjects were twelve preschool children. There were five consecutive sessions in which children's questions were answered with brief but informative replies by the experimenter, and five consecutive sessions in which the experimenter responded to each question by saying "I don't know." Some children rarely asked questions while others asked questions almost continuously. A 60 percent increase in the frequency of questions asked resulted from sessions in which children received informative answers to their questions as compared to sessions where no information was given.

Ross and Killey (1977) studied the effect of questioning on retention of information. Children in the study were exposed in pairs to a series of slides and invited to take turns asking questions. Each child's questions were answered. The researchers found that "the child's own questions received greater attention as they stemmed from his own curiosity, and/or the answers were more easily stored in his own cognitive structure which had generated the questions in the first place" (314).

According to Piaget (1952), children's knowledge advances through the stages of cognitive development as they are actively involved with their environment. Citing the assumption that active exploration of an environment is likely to result in greater knowledge than passive exploration, Feldman and Acredolo (1979) examined the effect of
active versus passive exploration on memory for spatial location in children. The subjects were 40 three- and four-year olds and 40 nine- and ten-year olds. Assessment was done in four experimental conditions differing in the type of exploration allowed the child and in the presence or absence of a landmark to be remembered. Nine- and ten-year olds performed fairly consistently and very accurately across all conditions in the experiment. Three- and four-year olds performed more accurately in the active conditions than in the passive conditions. The hypothesis that "the younger children would benefit more than the older children from being allowed to actively explore the environment was confirmed" (698).

Investigating the hypothesis that there are individual differences in young children's expressions of curiosity, Henderson and Moore (1979) administered a battery of four tasks designed to measure curiosity and exploratory behavior to preschool and young elementary school children. Although the younger and older children differed in their strength of response, responses were characterized by similar patterns of explorations. As a result of the study, the researchers suggest that individual differences in exploratory behavior are due to differences in mode of response, style of exploration, and in the elicitors of exploratory behavior.

Peterson (1975) also found differences in preferences or modes of expressing curiosity among the subjects in her
study. The researcher observed the curiosity behavior of groups of children varying in age, race, and sex in the presence of strange adults. Children waited alone or with a strange adult in a room filled with curiosity-arousing objects. Children between the ages of seven and twelve years generally exhibited more curiosity when left alone, while children aged five and six years exhibited less curiosity under the same condition. Peterson suggests the need for a wider variety of conditions under which pupils are permitted to explore in order to accommodate what appear to be differentiated preferences or modes of expressing curiosity among children of elementary school age.

Recent research has tested the hypothesis that curiosity is multifaceted and not a manifestation of a single underlying construct. Kreitler, Zigler, and Kreitler (1975) designed a battery of tasks measuring behaviors claimed to reflect curiosity in young children to determine whether there are one or more types of curiosity. A factor analysis of the intercorrelations between nineteen curiosity measures yielded five factors: manipulatory curiosity, perceptual curiosity, conceptual curiosity, curiosity about the complex, and adjustive-reactive curiosity. The factors were independent of each other and differed in many respects. Kreitler et al. suggest that assessment of curiosity in children should always include a specification of the assessed type(s) of curiosity, and that an attempt should be
made to evaluate as wide a range of curiosity types as possible before a child is characterized as curious or noncurious.

Langevin (1971) also tested the hypothesis that curiosity is multifacted by comparing and interrelating seven different types of curiosity measures. The Otis-Lennon and Raven Matrices were also included to determine if the curiosity measures were distinct from IQ. Langevin found that the curiosity measures were distinct from intelligence as well as from each other. The researcher reported that boys and girls in the study tended to be curious in different ways and only number of questions asked and exploration time increased with age.

Foote (1985) investigated the development of curiosity in young children. Five tasks of curiosity designed by Kreitler et al. (1975) were administered individually to 30 three-year olds, 30 four-year olds, and 30 five-year olds. The predominant types of curiosity exhibited by all three age groups were perceptual curiosity, conceptual curiosity, and manipulatory curiosity. No predictable pattern for the development of the five types of curiosity among the different aged children could be cited. Like Kreitler et al. and Langevin, the researcher suggests that curiosity is not a manifestation of a single underlying construct.

In summary, researchers have revealed that there are individual differences in curiosity behavior among children.
For some children, curiosity is aroused under certain conditions and is expressed in selected modes and styles. Studies by Kreitler et al., Langevin, and Foote have shown that curiosity is multifaceted and that the measurement of curiosity in children should take into account not only children's individual differences but the precise measures of curiosity being used. In addition, adults can foster and maintain curiosity in children through modeling, attentiveness and sensitivity to children's need to explore, and by responding to children's questions in an informative and encouraging manner (Bradbard and Endsley 1980).
CHAPTER III

METHODS AND PROCEDURES OF THE STUDY

Curiosity about print in the environment is often cited as a factor which contributes to young children's natural emergence into reading (Chapter II). Therefore, this study employing measures of children's curiosity and print awareness was undertaken to determine the degree of relationship which exists between curiosity and print awareness among four-year-old children.

Selection of the Sample

The seventy-one subjects in this study were from the population of four-year-old children enrolled in six licensed child care and preschool settings in a north central Texas city of diversified agricultural, oil, and industrial interests. These six settings were chosen from all the city's licensed child care and preschool settings because they occurred in different geographical sections of the city.

Directors of these facilities were informed of the study by letter (Appendix C). Later, appropriate individuals in charge were contacted by phone to request a meeting to discuss the participation of their center or school in the study. Directors from the six facilities gave
permission for children from their center or school to participate in the study and they provided the researcher with lists of all four-year-old children attending the center or school. Subjects on lists from all six settings were assigned a number, and a table of random numbers was used to select one hundred children from 246 four-year-old subjects for participation in the study. Letters explaining the research and requesting permission for their child to participate in the study were sent to the parents (Appendix C). Eighty percent of the parents signed the permission form so a sample of eighty was obtained. During the course of the study, nine children dropped out due to illness or moving away from the area. Therefore, the total number of subjects in the study was seventy-one.

The subjects participating in the study were from a variety of ethnic backgrounds including thirteen Hispanics, twenty-one Blacks, thirty-three Anglos, two Italians, one Oriental, and one Indian. There were thirty-four girls and thirty-seven boys in the study. Economic levels represented in the study ranged from lower-working class to upper-middle class. Because the study was developmental in nature, the four-year-old sample was divided into three groups. The youngest fours were defined as children whose ages were between four years to four years three months; middle fours were defined as children between four years four months and four years six months; and oldest fours were defined as
children between the ages of four years seven months and four years nine months. Some of the children became five during the course of the collection of data. Although data were obtained for all three age groups, emphasis was placed on a comparison of the youngest and oldest fours. A description of the settings follows.

Two church-affiliated licensed preschools serving three- to four-year olds from middle- to upper-middle-class families participated in the study. Most of the children in these preschools were Anglo children. Another participating site was a church-affiliated TEA-accredited private school with pre-kindergarten to fifth-grade classrooms where most of the children were from middle- to upper-middle-class Anglo families. Also participating in the study were children from a Montessori school where most of them were Anglo from middle- to upper-middle-class families. In addition, public school pre-kindergarten classrooms of Black, Hispanic, and some Anglo children participated in the study. The school housing the three classrooms was located in a low-income area of town. Another participant was a licensed child-care center serving low-income families. Children from this center were from a variety of ethnic backgrounds.

Instrumentation

The tasks for measuring the curiosity behavior of the children in the sample were developed by Kreitler, Zigler,
and Kreitler in 1975. "The five tasks represent the main procedures used in the study of curiosity in children and provide measures of the major possible manifestations of curiosity" (187). Content validity of the tasks was established by Kreitler et al. through the use of a panel of judges and the reliability between independent raters ranged from .91 to 1.00 on the different tasks (183-193). A description of the five tasks of curiosity together with the variables measured under each task follows. Variables are stated as they were by Kreitler et al.

Description of Tasks of Curiosity

Task A: Observation of Simple and Complex Stimuli

Nine pairs of stimuli or designs, drawn in black ink on white cardboard, were shown to the child in a four-sided open box constructed so that the child could view either the card on his right or the one on his left, but he could not view them both together. Each pair of cards contained one simple and one complex design. The cards were presented in random order as to sequence and right-left placement. The amount of time the child spent viewing each stimulus and the number of times the child switched glance from right to left stimulus or vice versa was recorded.

Variables to be measured included:

Variable 1: Mean time spent viewing the simple stimulus in each of the nine pairs.
Variable 2: Mean time spent viewing the complex stimulus in each of the nine pairs.

Variable 3: Mean time difference between viewing the complex and the simple stimulus in each stimulus pair.

Variable 4: Number of times the child switches his glance from the right to the left stimulus or vice versa in the course of viewing all of the stimulus pairs.

Variable 5: Number of pairs whose complex stimulus was viewed longer than the simple stimulus.

Task B: Preference for Simple or Complex Stimuli

In this task the child was asked to verbally state a preference for one of each of ten pairs of simple and complex stimuli cards (Appendix A). The stimuli, drawn in black ink on white cardboard, were presented side by side on a table in front of the child in random order as to sequence and right-left placement. The child’s preference for either complex or simple stimuli was recorded.

Variables measured included:

Variable 6: Number of complex stimuli preferred by the child on the ten pairs.

Variable 7: Number of times the child switched his preference from a simple stimulus on one stimulus pair to a complex stimulus on another stimulus pair or vice versa.
Task C: Preference for the Known and Unknown

The stimuli for this task consisted of cardboard folded in the shape of "houses." Each "house" had two flaps. One of the flaps had a picture on the outside with the same picture underneath. The outside of the other flap was blank and had a novel picture underneath. The pictures were drawn in black ink on white background and the stimuli were shown to the child in random order. The child was instructed to open one flap and only one each time. The rater, Adult 1, recorded which flap was opened on each stimulus.

Variables measured included:

Variable 8: Number of stimuli on which the child opened the flap with no picture on the outside.

Variable 9: Number of times the child switched from opening a flap blank or the outside to opening a flap with an outside picture or vice versa.

Task D: Extent of Structure of Meaning of Ordinary Objects

In this task, the child was shown (not given) the following toys: a medium-sized car, an iron, a telephone, and a piano. The rater, Adult 1, recorded the child’s responses to the toys. These responses were later categorized using Kreitler et al.'s system of categorization of meaning dimensions (Appendix 2).

Variables measured included:
Variables 10: Number of different response units (units which communicate something about the object) used to convey the meaning of all four objects.

Variable 11: Number of different meaning dimensions (e.g., the referent’s function, mode of operation, place of existence, etc.) used to convey the meaning of all four objects.

Task E: Object Manipulation

This task measured the type and duration of manipulations with objects and active information-seeking behavior. The child had the choice of playing with the toys used in Task D or with another set of toys including a truck, a red board with removable screws and flaps, a set of stacking barrels, and a kaleidoscope. The child was allowed to play for ten minutes while the rater observed and recorded the child’s manipulations. After the ten minutes, the rater encouraged the child to ask questions about the toys and the rater recorded the number of questions asked.

Variables measured included:

Variable X: (Unnumbered because due to its dichotomous nature it was not included in the factor analysis.) The child’s choice to play with new or with partially familiar toys.
Variable 12: The time interval (in seconds) between the end of the rater's question about choice and the child's response.

Variable 13: Total number of inspective manipulations, i.e., takes object in hand and looks at it, mostly while turning it around.

Variable 14: Total number of manipulations using the object in its customary manner, e.g., plays phoning and listening with the phone, plays tones on the piano or views the image in the kaleidoscope.

Variable 15: Total number of exploratory manipulations, exploring the manner in which the object operates or is structured, e.g., attempts to loosen or detach some fixed part(s) of the object apart, handles various moving parts.

Variable 16: Total number of manipulations, i.e., the sum of Variables 13, 14, and 15.

Variable 17: Total time spent exploring or manipulating the four objects.

Variable 18: Weighted index of questions asked about the toys after the playing period.

A final variable based on teacher ratings was also used in the Kreitler et al. study:

Variable 19: The teacher's averaged ratings of the child on two, five-point scales defined in the following manner: "As compared to the other children, the child is interested in many things vs. uninterested at all," and, "As
compared to the other children, the child is highly curious vs. not curious at all" (Kreitler et al. 1975, 193).

Detailed instructions for scoring procedures are in Appendix A. Materials necessary for the administration of the five tasks of curiosity were prepared by the researcher based on the description of the materials by Kreitler et al. (1975, 187-193). Checklists for recording data and additional materials needed for administration of the tasks were developed by Foote (1985) and used with permission (Appendix D). Permission to use the five tasks of curiosity was granted by Edward Zigler (Appendix D).

To measure the print awareness of the children in the study, the Signs of the Environment and Book Handling Knowledge tasks were used. The Signs of the Environment was written by Goodman in 1975 to assess children's reactions to the print they see in their environment everyday. This task was developed over a period of seven years by Goodman with the assistance of graduate students. Signs of the Environment has been used in several studies (Goodman and Altwerger 1981; Harst, Burke and Woodward 1982; Haussler 1982; Romero 1983). The task consisted of three levels of contextualization of reading environmental signs in order to determine children's knowledge about print in these different settings. At Level 1, the stylized logos of fourteen familiar foods, household product labels, or street signs were used in full color, surrounded by the familiar symbols and
designs associated with the items. These were mounted on pages of a loose-leaf binder. At Level 2, the graphic unit retained the style and color, but was not accompanied by the surrounding symbols, designs or pictures. Items at Level 2 were also mounted on the pages of a loose-leaf binder. At Level 3, all supporting context--color, pictures, designs--was removed from the original labels and the graphic unit itself was printed in manuscript form in black type on white index cards (Appendix B). The fourteen items presented for identification to the children were: Stop, Coca-Cola, Kentucky Fried Chicken, McDonald's, Vanilla Wafers, Saltine Crackers, Crest Toothpaste, Dairy Queen, Crayola Crayons, U.S. Mail, Texaco, Oak Farms Milk, Campbell's Soup, and Froot Loops (Appendix B). Sample questions included What does it say?, How do you know?, Where does it say ___? Responses were recorded on a score sheet and categorized according to a categorization system developed by Goodman and Altwerger (Appendix B).

The Book Handling Knowledge task was adapted by Goodman from Clay's (1973) Concepts About Print Test. This task was designed to reveal children's knowledge and use of print in books. Studies with this instrument have been done in New Zealand, Canada, and the United States (Goodman and Altwerger 1981; Romero 1983). Clay (1973) reported a split-half reliability coefficient of .95 for 40 five- to seven-year-old children in 1968 and found a correlation of .79 between
CAP and Word Reading for 100 six-year-old children in 1966 (17). Day and Day (1986) reported test-retest reliability for the CAP, and temporal stability coefficients higher than .70 were reported for fifty-six children in five repeated administrations of the CAP for over the kindergarten and first-grade years. Other studies (Johns 1980a; Day, Day, Spicola and Griffin 1981) have also reported strong positive correlations between the CAP and reading subtests of several standardized tests.

The Book Handling Knowledge task contains the following twenty-two items (Goodman and Altwerger 1981).

Item 1: Subject is shown the book and asked to tell what it’s called.

Item 2: Subject is to tell what is done with a book.

Item 3: Subject is to tell what is inside the book.

Item 4: Subject is to show the front of the book and then to open the book so that it can be read.

Item 5: Subject is to identify "page."

Item 6: Subject is asked to read the book.

Item 7: If subject won’t or is unable to read, interactor reads the book. Subject is to tell where to begin.

Item 8: Subject is to point to "top" and "bottom" of a page.

Item 9: Subject is to point to exact first word on page for beginning reading.

Item 10: Subject is to indicate left-to-right sweep.
Item 11: Subject is to point to top line to bottom line for continuation of reading.

Item 12: Subject is to provide exact matching of spoken word with written word as interactor reads.

Item 13: Subject is to point to first line of print on next page for continuation of reading.

Item 14: Subject is to respond that print is upside down.

Item 15: Subject is to show 1, then 2 letters.

Item 16: Subject is to show 1, then 2 words.

Item 17: Subject is to show first letter of a word.

Item 18: Subject is to point to a capital letter.

Item 19: Subject is to show the name of the book.

Item 20: Subject is to tell something about the story.

Item 21: Subject is to show the beginning and the end of the story.

Item 22: Subject is to tell what "written by _____" means.

One point was given for correct or appropriate answers and zero was given for no response or inappropriate response (Goodman and Altwerger 1981; Romero 1983). Permission was granted by Goodman to use the Signs of the Environment and Book Handling Knowledge tasks (Appendix D). All materials needed for administering the print awareness tasks were prepared by the researcher following Goodman’s (1981) descriptions.
Collection of the Data

A pilot study was conducted prior to the actual study to clarify and evaluate procedures. The curiosity measure was administered on an individual basis by a trained rater, known as Adult 1, to 8 four-year-old Anglo children from a church-sponsored nursery school who did not participate in the actual study. One week later, the print awareness tasks were administered on an individual basis by a second trained rater, known as Adult 2, and the researcher. Testing was conducted in the mornings in a private room not in use by anyone at the time. The results of the pilot study indicated that the battery of tasks used in this study was appropriate for obtaining information about the curiosity and print awareness behavior of four-year-old children. The materials used appeared to be interesting to the children, the tasks were fairly easy to administer, and the procedures followed seemed to work well with this age group.

The raters, Adults 1 and 2 who assisted the researcher in the study, both had an earned bachelor's degree in education and at least one year of experience in working with young children. All tasks were administered on an individual basis to all the children in the sample. Adult 1 administered the curiosity measure and Adult 2, together with the researcher, administered the print awareness tasks. Three weeks before the actual data collection, the researcher met with the raters individually and explained
the purposes of the study and demonstrated the tasks. The raters were provided with materials and written instructions for administering the tasks. Practice sessions were conducted with the use of the materials and then with the representative group of children from the church-sponsored preschool who did not participate in the study. The researcher monitored the raters during this time. The researcher and the raters independently rated the children and analyzed responses until a 90 percent or better agreement was achieved for all measures for interrater reliability.

The researcher made arrangements for testing at each participating setting. At all settings, testing was conducted only in the mornings in a private area not in use at the time. All materials needed for testing were brought into the room and removed each day. In order to control sample contamination, subjects to whom the tasks had been administered were not allowed to play with subjects in the sample to whom the tasks had not yet been administered. At the beginning of each session, the raters interacted informally with the individual subjects to be tested, asking approximately the same type of questions to all in order to reduce any anxiety or shyness on the part of the subjects.

The six centers or schools participating in the study were assigned a letter, A to F. Testing was begun with the "A" group. Testing with the other groups followed
consecutively. Adult 1 administered the five tasks of curiosity to all subjects individually. Administration of the curiosity measure took approximately twenty to thirty minutes for each child. Children’s responses were recorded on a score sheet by Adult 1 and all sessions were audio-taped for later analysis by the researcher and Adult 1.

One week following the administration of the curiosity measure, beginning with the "A" group, the print awareness tasks were administered during three separate sessions. There was a one-day interval between sessions for all children in the study. The three levels of contextualization of environmental print were presented to the subjects on an individual basis. During session one, Level 1 of the Signs of the Environment task was presented; Level 2 was presented during session two; and during session three, Level 3 of the Signs task was presented. The same fourteen items were presented at each session in a different order but following the same order for all subjects. Adult 2 was the interactor and, sitting beside the subject, directed the subject’s attention to the pages of a loose leaf binder on which the items were mounted. Items were presented one at a time and dialogue continued until the subject had nothing more to say about an item. Sessions were audio-taped and field notes taken by the researcher for future categorization and analysis.
The Book Handling Knowledge task was administered to each subject during the third session following Level 3 of the Signs of the Environment task. Each subject, on an individual basis, was handed the book, *The Carrot Seed* by Ruth Krauss, and asked to read it by the interactor, Adult 2. If the child could not read or preferred not to, the interactor read the book to the child. The Book Handling Knowledge task was given during this time. The researcher recorded the subject's responses on the score sheet. This task was also audio-taped and field notes taken by the researcher for future analysis. Print awareness measures took approximately fifteen to twenty minutes per session.

Analysis of the Data

Canonical correlation analysis was used to determine the degree of relationship between curiosity and print awareness of the four-year-old children in the sample. Canonical correlation analysis is used when a researcher is primarily interested in exploring a relationship between variable sets. "It identifies the components of one set of variables that are most highly related to the 'components' of the other set of variables" (Thompson 1984, 13). The canonical correlation showed no significant relationship between measures of curiosity and print awareness. Therefore, an alternate approach, Pearson product-moment correlation was also used to determine the relationship
between curiosity and print awareness of the subjects in the sample. The product-moment correlation is a measure of the magnitude or degree of the relationship between two variables or some combination of variables. For the purposes of the study, both the .05 and .10 levels of significance were utilized. The .05 level of significance was used because it is the most commonly accepted level of significance in social science research (Vockell 1983). The .10 level of significance was used in order to increase statistical power. "... it might spotlight a potentially important difference or relationship that would have been overlooked..." (Borg 1983, 380).
CHAPTER IV

RESULTS OF THE STUDY

This study explored the relationship between curiosity and print awareness of four-year-old children. Data were collected for seventy-one four-year olds from preschools and child-care centers in a north central Texas city. Each subject’s curiosity was measured using Kreitler, Zigler, and Kreitler’s five tasks of curiosity (1975), and print awareness was measured using Goodman’s Signs of the Environment and Book Handling Knowledge tasks (1981).

Data Related to Curiosity Measure

Mean frequencies and standard deviations of the responses by age (youngest four-year olds, middle four-year olds, and oldest four-year olds) to the nineteen variables measured during the administration of the five tasks of curiosity are presented in Table 1.

Overall, on most variables, few differences in the scores for the subjects were observed. For all age groups, frequencies were high for Variable 4, the number of times the child switched his glance while viewing all the stimulus pairs; Variable 10, the number of meaning values or response units expressed by the child; and Variable 16, total number of manipulations. Frequencies for all subjects were low for
<table>
<thead>
<tr>
<th>Task</th>
<th>Variables</th>
<th>Youngest 4s</th>
<th>Middle 4s</th>
<th>Oldest 4s</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M  SD</td>
<td>M  SD</td>
<td>M  SD</td>
</tr>
<tr>
<td>A</td>
<td>1. Simple stimuli--mean observation time</td>
<td>2.12 0.89</td>
<td>2.00 0.84</td>
<td>2.42 1.49</td>
</tr>
<tr>
<td></td>
<td>2. Complex stimuli--mean observation time</td>
<td>2.49 1.18</td>
<td>1.97 0.63</td>
<td>2.56 1.62</td>
</tr>
<tr>
<td></td>
<td>3. Mean time difference between complex and simple stimuli</td>
<td>1.21 0.62</td>
<td>1.00 0.45</td>
<td>1.27 0.97</td>
</tr>
<tr>
<td></td>
<td>4. Switching glance--total number</td>
<td>27.58 7.73</td>
<td>25.75 6.1</td>
<td>28.1 10.03</td>
</tr>
<tr>
<td></td>
<td>5. Number of pairs whose complex stimulus was viewed longer</td>
<td>4.35 1.32</td>
<td>3.25 1.61</td>
<td>3.44 1.79</td>
</tr>
<tr>
<td>B</td>
<td>6. Number of complex stimuli preferred</td>
<td>4.23 1.95</td>
<td>4.25 1.12</td>
<td>4.15 1.96</td>
</tr>
<tr>
<td></td>
<td>7. Switching preference--total number</td>
<td>4.52 1.69</td>
<td>4.56 1.67</td>
<td>3.89 1.73</td>
</tr>
<tr>
<td>C</td>
<td>8. Choosing the unknown--total number</td>
<td>1.29 1.15</td>
<td>2.25 1.77</td>
<td>2.71 2.19</td>
</tr>
<tr>
<td></td>
<td>9. Switching choice--total number</td>
<td>1.76 1.71</td>
<td>2.25 1.80</td>
<td>3.18 2.41</td>
</tr>
<tr>
<td>D</td>
<td>10. Number of meaning values</td>
<td>13.52 7.71</td>
<td>12.18 8.83</td>
<td>13.50 6.01</td>
</tr>
<tr>
<td></td>
<td>11. Number of meaning dimensions</td>
<td>3.58 1.50</td>
<td>3.68 1.92</td>
<td>3.89 1.15</td>
</tr>
<tr>
<td>Task</td>
<td>Variables</td>
<td>Youngest 4s</td>
<td>Middle 4s</td>
<td>Oldest 4s</td>
</tr>
<tr>
<td>------------</td>
<td>----------------------------------------</td>
<td>-------------</td>
<td>-----------</td>
<td>-----------</td>
</tr>
<tr>
<td>E 12.</td>
<td>Time interval of choice</td>
<td>1.88 1.05</td>
<td>1.68 0.60</td>
<td>2.05 1.60</td>
</tr>
<tr>
<td></td>
<td>Number of &quot;inspecting&quot; manipulations</td>
<td>3.23 2.86</td>
<td>3.93 2.29</td>
<td>2.34 1.81</td>
</tr>
<tr>
<td>14.</td>
<td>Number of &quot;customary use&quot; manipulations</td>
<td>7.64 5.30</td>
<td>11.31 6.57</td>
<td>6.26 4.32</td>
</tr>
<tr>
<td>15.</td>
<td>Number of &quot;exploratory&quot; manipulations</td>
<td>6.47 4.03</td>
<td>7.5 3.42</td>
<td>5.86 5.07</td>
</tr>
<tr>
<td>16.</td>
<td>Total number of manipulations</td>
<td>17.35 9.68</td>
<td>22.75 7.82</td>
<td>14.47 9.15</td>
</tr>
<tr>
<td>17.</td>
<td>Total time of manipulations</td>
<td>7.35 3.04</td>
<td>8.31 2.27</td>
<td>6.67 3.49</td>
</tr>
<tr>
<td>18.</td>
<td>Weighted index of questions</td>
<td>5.00 8.20</td>
<td>3.50 5.83</td>
<td>2.44 3.77</td>
</tr>
<tr>
<td>19.</td>
<td>Teacher's rating</td>
<td>3.47 0.94</td>
<td>3.50 1.36</td>
<td>3.82 1.15</td>
</tr>
</tbody>
</table>
time spent viewing simple and complex stimuli (Variable 1, Variable 2, Variable 3); choosing the unknown (Variable 8); and time interval between end of the researcher's question about choice and the child's response (Variable 12).

Youngest four-year olds demonstrated the lowest frequencies for choosing the unknown (Variable 8), switching choice (Variable 9), number of meaning dimensions (Variable 11), and teacher's rating (Variable 19); while oldest fours demonstrated the highest frequencies for these variables among subjects. The highest frequencies in weighted index of questions asked about objects (Variable 18) were observed for youngest four-year olds while oldest four-year olds had the lowest frequencies on this variable.

Among subjects, oldest fours demonstrated the lowest frequencies on variables concerned with object manipulations (Variable 13 - Variable 17). Middle fours demonstrated the highest frequencies on these variables. Youngest and oldest fours demonstrated higher frequencies than middle fours on the following variables: time spent viewing complex stimuli (Variable 2), number of times switching glance (Variable 4), number of complex stimulus pairs viewed longer (Variable 5), number of meaning values or response units (Variable 10), and time interval of choice (Variable 12).

Table 2 contains the results for Variable X, child's choice to play with the new or partially familiar toys.
TABLE 2

NUMBER OF CHILDREN SELECTING NEW AND PARTIALLY FAMILIAR TOYS: VARIABLE X

<table>
<thead>
<tr>
<th>Group</th>
<th>Choice of Toys</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New Toys</td>
<td>Partially Familiar</td>
</tr>
<tr>
<td>Youngest Four-Year Olds</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>Middle Four-Year Olds</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Oldest Four-Year Olds</td>
<td>6</td>
<td>32</td>
</tr>
</tbody>
</table>

Variable X is not included in the table with the other variables because of its dichotomous nature.

Data Related to Print Awareness Tasks

The Signs of the Environment task included three levels of print awareness. At Level 1, children were shown print in context, such as whole labels. At Level 2, the same labels were shown retaining their stylized print and color but stripped of all familiar accompanying pictures and designs. At Level 3, all supporting context was removed and the graphic unit was presented in manuscript form in black ink on white index cards.

Tables 3, 4, and 5 provide frequencies and percentages of categorized responses for all subjects in this study at Levels 1, 2, and 3.
### TABLE 3
RESPONSES OF ALL SUBJECTS TO LEVEL 1

<table>
<thead>
<tr>
<th></th>
<th>Avoidance</th>
<th>Appropriate</th>
<th>Generic-Specific</th>
<th>Parallel</th>
<th>Related Concept</th>
<th>Function</th>
<th>Chaining</th>
<th>Non-Print Related</th>
<th>Print Related</th>
<th>Unrelated</th>
<th>Discontinued</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of Responses</td>
<td>148</td>
<td>497</td>
<td>179</td>
<td>26</td>
<td>14</td>
<td>6</td>
<td>49</td>
<td>0</td>
<td>3</td>
<td>72</td>
<td>0</td>
</tr>
<tr>
<td>Percent of Responses</td>
<td>14.8</td>
<td>50.0</td>
<td>18</td>
<td>2.6</td>
<td>1.4</td>
<td>0.6</td>
<td>4.9</td>
<td>0</td>
<td>0.3</td>
<td>7.2</td>
<td>0</td>
</tr>
</tbody>
</table>

71 Subjects x 14 Items = Total Potential

### TABLE 4
RESPONSES OF ALL SUBJECTS TO LEVEL 2

<table>
<thead>
<tr>
<th></th>
<th>Avoidance</th>
<th>Appropriate</th>
<th>Generic-Specific</th>
<th>Parallel</th>
<th>Related Concept</th>
<th>Function</th>
<th>Chaining</th>
<th>Non-Print Related</th>
<th>Print Related</th>
<th>Unrelated</th>
<th>Discontinued</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of Responses</td>
<td>361</td>
<td>288</td>
<td>94</td>
<td>18</td>
<td>16</td>
<td>3</td>
<td>25</td>
<td>0</td>
<td>2</td>
<td>187</td>
<td>0</td>
</tr>
<tr>
<td>Percent of Responses</td>
<td>36.3</td>
<td>29</td>
<td>9.5</td>
<td>1.8</td>
<td>1.6</td>
<td>0.3</td>
<td>2.5</td>
<td>0</td>
<td>0.2</td>
<td>18.8</td>
<td>0</td>
</tr>
</tbody>
</table>

71 Subjects x 14 Items = Total Potential
TABLE 5
RESPONSES OF ALL SUBJECTS TO LEVEL 3

<table>
<thead>
<tr>
<th>Frequency of Responses</th>
<th>Avoidance</th>
<th>Appropriate</th>
<th>Generic-Specific</th>
<th>Parallel Concept</th>
<th>Related</th>
<th>Function</th>
<th>Chaining</th>
<th>Non-related Print</th>
<th>Print Related</th>
<th>Unrelated</th>
<th>Discontinued</th>
<th>Total Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>313</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16</td>
<td>93</td>
<td>0</td>
<td>568</td>
</tr>
</tbody>
</table>

| Percent of Responses   | 31.4      | 0.4         | 0                 | 0                | 0       | 0        | 0        | 0                 | 1.6           | 9.3       | 57.1         |                |

71 Subjects x 14 Items = Total Potential

Appropriate responses to the items presented for all subjects represented 50 percent of the responses at Level 1. Generic-specific responses were 18 percent. There were 14.8 percent avoidance responses at this level.

With less contextual support of the print at Level 2, appropriate responses dropped to 29.0 percent. Generic-specific responses dropped to 9.5 percent. Unrelated responses increased to 18.8 percent and avoidance responses also increased to 36.6 percent.

At Level 3, in responding to the graphic unit printed in manuscript on a card, appropriate responses decreased to 0.4 percent of the total. Avoidance responses were 31.4
percent. When a child had five avoidance responses in a series, Level 3 was discontinued. Therefore, 57.1 percent responses might have been avoidance responses. Subjects called out letter names or responded in some way to print features of the items at this level. Tables 6, 7, and 8 provide a comparison of Levels 1, 2, and 3 by age (youngest, middle and oldest fours).

At Level 1, appropriate responses were similar for the three age groups with youngest and oldest four-year olds demonstrating higher percentages than the middle four-year olds. When generic-specific responses were added to appropriate responses, the percentages increased accordingly: youngest fours, 65.5 percent; middle fours, 60.2 percent; and oldest fours, 72.3 percent. For all three groups, the highest percentage of responses decreased in the "appropriate" category. Youngest and middle fours made print related responses. Middle fours had a higher percentage of unrelated responses than either the youngest or oldest fours.

At Level 2, all three groups decreased in appropriate responses with youngest and oldest fours having a higher percentage of appropriate responses than middle fours. For the youngest and middle fours, the highest percentage of responses was in the "avoidance" category. For the oldest fours, the highest percentage was still in the "appropriate" category. The rate of percentage of unrelated
responses went up as compared to Level 1 for all groups as did the percentage rates for the avoidance responses.

At Level 3, there were too few appropriate responses for a comparison of subjects. The youngest four-year olds presented the only appropriate responses with a 1.7 percent rate. Middle four-year olds provided the most print-related responses (4.9%), as well as throughout all three levels of testing. The only other responses made during this level
TABLE 7
RESPONSES BY AGE TO LEVEL 2

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Avoidance</th>
<th>Appropriate</th>
<th>Generic-Specific</th>
<th>Parallel</th>
<th>Related Concept</th>
<th>Function</th>
<th>Chaining</th>
<th>Non-print Related</th>
<th>Print Related</th>
<th>Unrelated</th>
<th>Total Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Youngest 4s</td>
<td>110</td>
<td>73</td>
<td>21</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>23</td>
<td>0</td>
</tr>
<tr>
<td>%</td>
<td>46.2</td>
<td>30.7</td>
<td>8.8</td>
<td>1.3</td>
<td>1.3</td>
<td>0</td>
<td>2.1</td>
<td>0</td>
<td>0</td>
<td>9.7</td>
<td>0</td>
</tr>
<tr>
<td>Middle 4s</td>
<td>86</td>
<td>46</td>
<td>23</td>
<td>5</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>54</td>
<td>0</td>
</tr>
<tr>
<td>%</td>
<td>38.4</td>
<td>20.5</td>
<td>10.2</td>
<td>2.2</td>
<td>1.8</td>
<td>0</td>
<td>1.8</td>
<td>0</td>
<td>0.9</td>
<td>24.1</td>
<td>0</td>
</tr>
<tr>
<td>Oldest 4s</td>
<td>165</td>
<td>169</td>
<td>50</td>
<td>10</td>
<td>9</td>
<td>3</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>110</td>
<td>0</td>
</tr>
<tr>
<td>%</td>
<td>31.0</td>
<td>31.8</td>
<td>9.4</td>
<td>1.9</td>
<td>1.7</td>
<td>0.6</td>
<td>3.0</td>
<td>0</td>
<td>0</td>
<td>20.7</td>
<td>0</td>
</tr>
</tbody>
</table>

decreased in the avoidance and unrelated categories. Youngest fours had the highest percentage of avoidance responses.

The Book Handling Knowledge task was used to determine the subjects' knowledge and use of print in books. Table 9 presents responses and percentages by age for the Book Handling task.
TABLE 8
RESPONSES BY AGE TO LEVEL 3

<table>
<thead>
<tr>
<th></th>
<th>Avoidance</th>
<th>Appropriate</th>
<th>Generic-Specific</th>
<th>Parallel Concept</th>
<th>Function</th>
<th>Chaining</th>
<th>Non-Print Related</th>
<th>Print Related</th>
<th>Unrelated</th>
<th>Discontinued</th>
<th>Total</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Youngest 4s</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>13</td>
<td>130</td>
<td>238</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>90</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.4</td>
<td>5.5</td>
<td>54.6</td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>37.8</td>
<td>1.7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.4</td>
<td>5.5</td>
<td>54.6</td>
<td></td>
</tr>
<tr>
<td>Middle 4s</td>
<td>69</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>16</td>
<td>128</td>
<td>224</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4.9</td>
<td>7.1</td>
<td>57.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>30.8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4.9</td>
<td>7.1</td>
<td>57.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oldest 4s</td>
<td>154</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>64</td>
<td>310</td>
<td>532</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.8</td>
<td>12.0</td>
<td>58.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>28.9</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.8</td>
<td>12.0</td>
<td>58.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When children were asked through a series of questions to demonstrate how a book is actually manipulated in order to read, all subjects indicated that they knew that one begins to read at the front of the book. A higher percentage of youngest subjects than middle and oldest subjects responded that print was upside down when the interactor asked if the book could be read in that manner. Fifty-three
## TABLE 9

**BOOK HANDLING KNOWLEDGE TASK BY AGE**

<table>
<thead>
<tr>
<th>Items</th>
<th>Youngest 4s</th>
<th>Middle 4s</th>
<th>Oldest 4s</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identifies Book</td>
<td>16</td>
<td>14</td>
<td>37</td>
</tr>
<tr>
<td>2. Book Function</td>
<td>16</td>
<td>15</td>
<td>35</td>
</tr>
<tr>
<td>3. Inside Book</td>
<td>13</td>
<td>10</td>
<td>29</td>
</tr>
<tr>
<td>4. Front of Book</td>
<td>15</td>
<td>13</td>
<td>35</td>
</tr>
<tr>
<td>5. &quot;Page&quot;</td>
<td>14</td>
<td>13</td>
<td>34</td>
</tr>
<tr>
<td>6. Reading of Book</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7. Print - First Page</td>
<td>8</td>
<td>7</td>
<td>22.5</td>
</tr>
<tr>
<td>8. Top/Bottom of a Page</td>
<td>7</td>
<td>10.5</td>
<td>24</td>
</tr>
<tr>
<td>9. First Word on Page</td>
<td>2</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>10. Left to Right</td>
<td>2</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>11. Top Line/Bottom Line</td>
<td>3.5</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>12. Matching-Spoken/ Written Word</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13. First Line Print/ Sequence</td>
<td>7.5</td>
<td>9.5</td>
<td>27.5</td>
</tr>
<tr>
<td>14. Upside-down</td>
<td>14</td>
<td>10.5</td>
<td>28.5</td>
</tr>
<tr>
<td>15. 1 Letter, 2 Letters</td>
<td>9</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>16. 1 Word, 2 Words</td>
<td>.5</td>
<td>1.5</td>
<td>7</td>
</tr>
<tr>
<td>17. First Letter</td>
<td>8</td>
<td>9</td>
<td>25</td>
</tr>
<tr>
<td>18. Capital Letter</td>
<td>2</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>19. Title</td>
<td>5</td>
<td>8</td>
<td>23</td>
</tr>
<tr>
<td>20. Story Re-Telling</td>
<td>5</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>21. Beginning/End</td>
<td>0</td>
<td>.5</td>
<td>0</td>
</tr>
<tr>
<td>22. Authorship</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

Correct Responses %
percent of the subjects indicated that print (not the pictures) tells the story. Few subjects were able to show that print is read left to right (32%) and from top to bottom (31%) with middle and oldest fours performing better than youngest fours on both of these items. None of the subjects was able to provide an exact matching of spoken words with written words when asked to point to the story while the interactor read it.

Percentages were low for all three age groups on some items requiring knowledge of language terms about written language. When asked to locate one and two letters and then one and two words, a higher percentage of subjects was able to locate letters but did not perform as well with locating words. Oldest and middle fours performed better than youngest fours on these items.

Thirty percent of the youngest fours, 50 percent of the middle fours, and 60 percent of the oldest fours could point to the title of the book. Only two youngest fours and three oldest fours responded correctly when the interactor read the title of the book and the name of the author and asked, "What does written by Ruth Krauss mean?"

After the story had been read to the children, the children were asked to tell something about the story. In this study, 29 percent of the youngest fours were able to do so, 38 percent of the middle fours were able to and 50
percent of the oldest fours were able to retell the story in an appropriate manner demonstrating comprehension.

Table 10 presents means and standard deviations by age for print awareness tasks. The oldest fours had the highest mean frequencies for the Signs task and the Book Handling task as compared with youngest and middle fours. Middle fours had the lowest mean frequencies for print awareness and youngest fours had the lowest mean frequencies for book handling knowledge.

Data Related to Research Questions

Two research questions were examined in this study. What is the degree of relationship between curiosity and print awareness among four-year-old children? Is the relationship the same for young four-year olds as it is for older four-year olds?

To answer these two research questions, canonical correlation analysis was performed with the nineteen variables of curiosity and two levels of the Signs of the Environment task and the Book Handling Knowledge task. Level 3 of the Signs of the Environment task was not included in the analysis because so few children at any age answered appropriately. The first analysis provided no significant findings. In their study, Kreitler et al. suggested that certain variables were direct measures of curiosity and other variables measured curiosity only in
TABLE 10
MEAN FREQUENCIES AND STANDARD DEVIATIONS
FOR PRINT AWARENESS TASKS

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Youngest 4s</th>
<th>Middle 4s</th>
<th>Oldest 4s</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Signs of the Environment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 1</td>
<td>9.52</td>
<td>2.85</td>
<td>8.87</td>
</tr>
<tr>
<td>Level 2</td>
<td>5.70</td>
<td>2.77</td>
<td>4.62</td>
</tr>
<tr>
<td>Level 3</td>
<td>0.23</td>
<td>0.75</td>
<td>0.00</td>
</tr>
<tr>
<td>Book Handling Knowledge</td>
<td>8.79</td>
<td>2.57</td>
<td>9.84</td>
</tr>
</tbody>
</table>

combination with other variables. Therefore, a second canonical correlation analysis was performed using eleven of the nineteen variables of curiosity. The following variables were used in the second canonical analysis: 2, 5, 6, 8, 10, 11, 13, 15, 16, 17, and 18. This second canonical correlation analysis also demonstrated no significant relationship between the direct measures of curiosity used in this analysis and print awareness tasks at the .05 level (p = .4328).

After the canonical correlation analysis, a Pearson Product Moment correlation was performed to investigate
possible relationships between the variables of curiosity and print awareness tasks. In this analysis, all nineteen variables of curiosity were correlated with the first two levels of Signs of the Environment and the Book Handling Knowledge tasks. At the .05 level of significance for all subjects, one relationship was found: Book Handling and curiosity Variable 8, choosing the unknown, had a low positive correlation ($r = .28, p = .016$). Four correlations were found at the .10 level of significance. Level 2 of the Signs task and curiosity Variable 2, complex stimuli mean observation time, had a low positive correlation ($r = .21, p = .071$); Level 2 of the Signs task and curiosity Variable 3, time difference between complex and simple stimuli, had a lost positive correlation ($r = .22, p = .55$); Book Handling and curiosity Variable 7, switching preference, had a low negative correlation ($r = -.20, p = .087$); and Level 2 of the Signs task and curiosity Variable 15, exploratory manipulations, had a low positive correlation ($r = .19, p = .094$).

A Pearson Product Moment correlation by age found some specific pairwise correlations. For youngest four-year olds, no relationships were found at the .05 level of significance. Three relationships were found at the .10 level of significance: Level 1 of the Signs task and curiosity Variable 2, complex stimuli mean observation time, had a moderate negative correlation ($r = -.44, p = .071$);
Level 2 of the Signs task and curiosity Variable 10, meaning values or response units, had a moderate positive correlation ($r = .44$, $p = .075$); Level 2 of the Signs task and curiosity Variable 19, teachers rating, had a moderate positive correlation ($r = .41$, $p = .098$).

For the middle four-year olds, no relationships were found at the .05 level of significance. At the .10 level of significance, Level 2 of the Signs task and curiosity Variable 4, switching glance, had a moderate positive correlation ($r = .48$, $p = .054$); Book Handling task and curiosity Variable 5, complex stimuli viewed longer, had a moderate negative correlation ($r = -.46$, $p = .069$); Level 2 of the Signs task and curiosity Variable 9, switching choice, had a moderate positive correlation ($r = .44$, $p = .080$); Level 2 of the signs task and curiosity Variable 17, total time of manipulations had a moderate negative correlation ($r = -.45$, $p = .077$).

For the oldest fours, three correlations were significant at the .05 level. Level 2, Signs task and curiosity Variable 10, number of meaning values or response units, had a moderate positive correlation ($r = .35$, $p = .029$); Level 2, Signs task and curiosity variable 19, exploratory manipulations, had a moderate positive correlation ($r = .34$, $p = .032$); and Level 2, Signs task and curiosity Variable 20, total manipulations, had a moderate positive correlation ($r = .35$, $p = .030$).
Four other correlations were significant at the .10 level for oldest fours. Level 2, Signs task and curiosity Variable 2, complex stimuli, had a low positive correlation ($r = .28$, $p = .078$); Level 2, Signs task and curiosity Variable 3, time difference for complex and simple stimuli, had a moderate, positive correlation ($r = .30$, $p = .060$); Level 2, Signs task and Curiosity Variable 21, total time of manipulations, had a low positive correlation ($r = .29$, $p = .071$); Book Handling and curiosity Variable 17, inspecting manipulations, had a moderate positive correlation ($r = .30$, $p = .060$).

Discussion of Results by Measure

Curiosity

Five tasks of curiosity developed by Kreitler, Zigler, and Kreitler (1975) were administered to seventy-one four-year-old children in this study. Review of the results of the curiosity measure (Table 1) shows high frequencies for the three age groups on Variable 4, switching glance; Variable 10, meaning values or response units; and Variable 16, total manipulations. In a comparison of this study with the findings in the Foote study (1985) of curiosity development among three-, four-, and five-year-old children, Foote's four-year olds also had high frequencies for Variable 4 (26.93) and Variable 10 (10.32). However, mean frequencies for Variable 16 were low (5.03) as compared to
those in this study. The subjects in this study spent less
time observing simple and complex stimuli (Variable 1 and
Variable 2) than did Foote's four-year olds (Variable 1 =
8.38; Variable 2 = 8.39). However, four-year-old subjects
in the present study had higher frequencies in those
variables of curiosity concerned with object manipulation
(Variable 13-Variable 17) than Foote's four-year olds
(Variable 13 = 1.67; Variable 14 = 2.51; Variable 15 = 1.03;
Variable 16 = 5.03; Variable 17 = 4.50).

Although mean frequencies on curiosity Variable 10
(meaning values or response units) for four-year olds in
this study were similar to frequencies for four-year olds in
Foote's study (Variable 10 = 10.32), Foote's subjects had
somewhat higher frequencies on Variable 11 (5.12), number of
meaning dimensions. Explanations for each of the meaning
dimensions are in Appendix A. When categorizing response
units (units that communicate something about the object)
into one of twenty-three meaning dimensions, Foote observed
that some children described sensory qualities of objects
and seemed to ignore their function or purpose. Other
children were aware of the function or purpose of the
objects, but said little about their characteristics. As a
result, Foote suggested that the development of children's
curiosity may depend in part on their style of learning. In
the present study, the most prevalent meaning dimensions
used by youngest and oldest fours focused on actions and
functions or purposes of the object. These responses were similar to those of the four-year olds in the Foote study. Meaning dimensions of middle fours in this study focused on objects' actions and sensory qualities.

In comparing the overall mean frequencies on the five tasks of curiosity, for oldest and youngest subjects, similar responses were observed for Task A, observation of simple and complex stimuli; Task B, preference for simple or complex stimuli; and Task D, structure of meaning. There were some differences in responses to Task C, preference for unknown, and Task E, object manipulations. For Variable 12, oldest subjects took a few more seconds to make a choice about toys than youngest subjects. As mentioned earlier, youngest fours had somewhat higher scores than oldest fours on those variables concerning manipulation of objects (Variables 13-18). Both groups manipulated objects in a customary manner more often. Youngest fours also had a higher weighted index of questions asked about toys after the playing period than the oldest fours. These findings are similar to other studies. Although their studies involved more than one age group of children, Foote (1985) and Henderson and Moore (1979) also found that oldest subjects had higher scores on preference for the unknown tasks and youngest subjects had higher scores on manipulations and questions asked.
Kreitler et al. (1975) examined a wide range of curiosity behaviors and found that they reflected five types of curiosity: manipulatory, perceptual, conceptual, curiosity about the complex, and adjustive-reactive curiosity. In examining the responses of the subjects in the present study on those variables identified by Kreitler et al. and later by Foote (Appendix A) as reflecting the five different types of curiosity, for the youngest and oldest subjects, the predominant types of curiosity were perceptual and conceptual curiosity. For Foote's subjects, the predominant types were also perceptual and conceptual. However, for middle fours in this study, the predominant types of curiosity were similar to those of Kreitler et al.'s six-year-old subjects, manipulatory and perceptual. Kreitler et al.'s findings have shown that curiosity is not a unitary construct or trait.

Print Awareness Tasks

The Signs of the Environment task consists of an interactor asking open-ended questions about print in the child's environment at three different levels of contextualization: Level 1, print in full context, such as whole labels; Level 2, labels with stylized print and color only; Level 3, graphic unit in manuscript form with no supporting context. Results shown in Tables 3, 4, and 5 indicated that context made a difference. The more context that was
available to the children, the greater frequency of appropriate responses. These findings parallel findings in the Goodman and Altwerger study. A review of Tables 6, 7, and 8 shows that at Levels 1 and 2, appropriate responses for all age groups were similar. At Level 2, youngest and oldest fours had higher percentage scores than middle fours. At Level 3, with only the printed word available to them, there were too few appropriate responses for all age groups. At this level of abstraction, subjects seemed to lose interest in the task almost immediately.

The Book Handling Knowledge task was administered to determine children's knowledge about print in books. Table 9 presented the findings of this task by age. Children in this study had some knowledge of book handling such as knowing the function of books, knowing where one begins when reading a book, knowing the sequence of turning the pages, and knowing that the print and not the illustrations conveys the message. However, subjects had difficulty locating letters and words. Higher percentages were observed for locating letters than for locating words. Goodman and Altwerger found similar results. More subjects located letters than words in their study. Fifty-one percent of the subjects in this study could point to the title of the book and only seven percent knew about the author. In Goodman and Altwerger's study of eleven subjects, two were able to point to the title of the book, and none indicated knowledge
of authorship. Oldest fours in this study tended to have better percentages than youngest fours on most items. In general, subjects seemed to know more about print in the environment than print in books.

Discussion Related to Research Questions

While no significant relationship was found between curiosity and print awareness using canonical correlation analysis, an alternate Pearson Product Moment correlation yielded nineteen specific pairwise correlations. The majority of the correlations for all subjects occurred between curiosity variables concerning manipulatory behavior and complex stimuli and print awareness Level 2 of the Signs task. At Level 2 of the Signs task, labels were shown to children retaining their stylized print and color but stripped of all familiar accompanying pictures and designs. This level of environmental print awareness, although presenting some challenge to the children, was not as easy for print recognition as Level 1 in which the label was presented in full context and not as difficult as Level 3 in which all supporting context was removed.

Differences were observed for pairwise correlations found among age groups. Pairwise correlations were more frequent and stronger for oldest fours as compared with middle and youngest fours in the study. Three pairwise correlations were significant at the .05 level for oldest
fours. A correlation between Level 2 Signs task and number of meaning values or response units (Variable 10) was significant for oldest fours at the .05 level and a similar correlation for youngest fours was significant at the .10 level. For oldest and middle fours, a correlation between Level 2, Signs task, and total time of manipulations (Variable 17) was significant for both at the .10 level.

Table 11 summarizes the pairwise correlations and indicates possible areas warranting further investigation. Caution must be used in interpreting these correlations, however. Because such a large number of correlations were run, the possibility of a significant or near significant correlation occurring just by chance was increased. For that reason, although .10 correlations were not considered significant, they were used as trend indicators to identify areas worthy of further investigations.
TABLE 11

SUMMARY OF PAIRWISE CORRELATIONS

<table>
<thead>
<tr>
<th>Curiosity Variable and Print Awareness</th>
<th>All</th>
<th>Youngest 4s</th>
<th>Middle 4s</th>
<th>Oldest 4s</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Var 2 with Signs, Level 1</td>
<td>-.44 *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var 2 with Signs, Level 2</td>
<td>.21 *</td>
<td>.28 *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var 3 with Signs, Level 2</td>
<td>.22 *</td>
<td>.30 *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var 4 with Signs, Level 2</td>
<td></td>
<td>.48 *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var 5 with Book Handling</td>
<td></td>
<td></td>
<td>-.46 *</td>
<td></td>
</tr>
<tr>
<td>B: Var 7 with Book Handling</td>
<td>-.20 *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C: Var 8 with Book Handling</td>
<td>-.28 **</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Var 9 with Signs, Level 2</td>
<td></td>
<td>.44 *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D: Var 10 with Signs, Level 2</td>
<td>.44 *</td>
<td>.35 **</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E: Var 13 with Book Handling</td>
<td></td>
<td>.30 *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var 15 with Signs, Level 2</td>
<td>.19 *</td>
<td>.34 **</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var 16 with Signs, Level 2</td>
<td></td>
<td>.35 **</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var 17 with Signs, Level 2</td>
<td></td>
<td>-.45 *</td>
<td>.29 *</td>
<td></td>
</tr>
<tr>
<td>Var 19 with Signs, Level 2</td>
<td></td>
<td>.41 *</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* ≤ .1  
** ≤ .05
CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The problem of this study was to determine the degree of relationship between curiosity and print awareness among four-year-old children. Five tasks of curiosity were administered individually to seventy-one children participating in the study. The five tasks included nineteen variables of curiosity identified by Kreitler, Zigler, and Kreitler as being the most often used measures of curiosity. Print awareness measures included three levels of the Signs of the Environment task and the Book Handling Knowledge task developed by Yetta Goodman. The tasks were administered to all the children on an individual basis following the curiosity measure.

Frequencies and means were calculated on subjects' responses to all tasks for descriptive statistics. In order to answer the specific research questions of the study, canonical correlation was used to analyze the data and determine the relationship between curiosity and print awareness among four-year-old subjects in the study. The analysis yielded no significant relationship between curiosity and print awareness. An alternate Pearson Product
Moment correlation was performed to further explore any possible relationship between curiosity and print awareness. The correlation yielded some specific pairwise correlations by age. For both research questions, the .05 and .10 levels of significance were utilized.

Findings

A summary of the major findings follows.

1. Individual differences in the manifestation of curiosity were observed among four-year-old subjects in the study.

2. Specific pairwise correlations were found between certain variables of curiosity and print awareness that may pave the way for further investigations of a connection between curiosity and print awareness.

3. Pairwise correlations found between curiosity and print awareness measures were more frequent and stronger for oldest four-year-olds.

4. Pairwise correlations were more frequent between print awareness Level 2 of the Signs of the Environment task and variables of curiosity concerning manipulatory behavior and complex stimuli.

5. There was a greater frequency of appropriate responses for all subjects during Level 1 of the Signs of the Environment task in which print is presented in full context.
6. At Level 3 of the Signs of the Environment task in which all supporting context is removed and the graphic unit is presented in manuscript, subjects seemed to lose interest quickly in the task and became restless and fidgety.

7. Oldest fours had higher mean frequencies of appropriate responses on print awareness tasks as compared to youngest fours.

8. All subjects performed better on environmental print awareness tasks than book handling knowledge.

9. Although many subjects indicated that print and not the illustrations communicates the message in books, few knew about the directionality of print and print-related terminology.

Conclusions

Based on the findings of the study, the following conclusions were drawn.

1. The possibility of a degree of correlation between specific curiosity behaviors and levels of print awareness suggests the need for further research in this area.

2. The more context available to children, the greater their ability to respond appropriately to print.

3. Knowledge of print in the environment is more advanced than knowledge of print in books for some children.
Recommendations

Further research should be conducted to investigate questions that have been raised related to possible correlations between specific curiosity behaviors and print awareness levels. In addition, since pairwise correlations were more frequent and stronger for oldest subjects in this study, future research needs to include five- and six-year olds for comparison.

A pairwise correlation between preference for complex stimuli and levels of print awareness was significant for youngest and oldest subjects in this study. Research should be conducted to determine whether preference for complex stimuli requires or produces more abstract levels of print awareness. With older subjects, for comparison in the study, there may be children with Level 3 behaviors in the Signs task which could yield interesting results.

Another pairwise correlation significant for both youngest and oldest subjects in the study was between number of response units and print awareness, Level 2 of the Signs tasks. Research should be conducted to determine whether children who have acquired diverse information about objects are also highly print aware.

Research should be conducted exploring a relationship between manipulatory curiosity and print awareness among four-, five-, and six-year-old children with relation to their socioeconomic background. Pairwise correlations found
in this study were more frequent between variables of curiosity involving manipulatory behavior and print awareness, Level 2 of the Signs task. In comparing mean frequencies of the children in this study with those of the children in Foote’s (1985) study, it was observed that subjects in the present study had higher frequencies on variables of manipulatory behavior than Foote’s middle-class subjects. Fifty-eight percent of the subjects in this study were from low socioeconomic backgrounds.

Children are aware of print in their environment. They deal with it in the context of their everyday lives and explore and inquire about it as they do other aspects of their world. Exploration and question-asking behaviors are two ways in which children manifest curiosity and inferential evidence from research suggests that curiosity is a factor in children’s early interest in and awareness of print. This exploratory study revealed some correlations which are considered encouraging about the connection between print awareness and curiosity warranting further investigations using other techniques and situations.
APPENDIX A

CURIOSITY MEASURE
Specific Directions for Administering Each Task

Task A: Observation of Simple and Complex Stimuli

The four-sided open box should be placed on a low table and the child should be seated in front of it, facing the perpendicular oblong board. The rater sits behind this board and is largely hidden by it. The rater should say:

"I would like to find out how interesting different pictures are for children. So, I will show you pictures, one here and one here (the two panels where the stimulus cards will be inserted are pointed out). I will always show you two pictures together. You can look at the pictures as long as you want. When you do not want to look anymore just say "yes" and I will show you other pictures."

The stimulus cards should have previously been arranged in random order as to sequence and right and left placement. The rater inserts each pair of stimulus cards into the panels for the child to observe. Without knowing which stimuli are being presented on the right and the left, the rater records the time spent by the child viewing the right and left stimuli. The rater does this by observing the head movements of the child in either direction and by simultaneously pressing the counter and stopwatch on the appropriate side.

When the child says that he is ready to see the next pictures, the rater looks at the stopwatch on each side and records the time spent viewing each stimulus card. The rater also looks at the counter to determine the number of
times the child switched his glance from the right to the left stimulus or vice versa. This information is recorded on the scoring sheet.

**Task B: Preference for Simple or Complex Stimuli**

The rater now gets out the stimuli pairs for Task B. (The stimuli pairs should have been arranged in random order prior to the child entering the room.) Then the rater says:

"I would like to find out how interesting different pictures are for children. So, I will show you pictures, always two pictures together, and you will tell me which one you like better."

The rater then presents each pair of stimuli side by side on the table in front of the child. As each pair of stimuli are presented the rater asks:

"Which picture do you like better, this one or this one? Show me?"

The rater sits by the child and records for each pair which stimulus the subject prefers.

**Task C: Preference for the Known and Unknown**

The rater says:

"Now we are going to play a game with some houses. I am going to show you one house at a time."

The rater then shows the child the demonstration "house" and says:

"Each house has two doors on it. You may lift one of the doors, but only one each time."
The rater then demonstrates this by lifting one of the flaps. The "houses" are then presented to the child one at a time and the rater records on the scoring sheet which flap the child opens on each stimulus.

**Task D: Extent of Structure of Meaning of Ordinary Objects**

The rater introduces this task by explaining:

"We are going to play a game now. I shall show you various things and you will tell me what they are. We'll make believe that I don't know what the thing is. You will tell me all about it, so that I can find out."

The rater then turns on the tape recorder and presents the first set of toys to the child one at a time. (The first set of toys includes a medium-size car, an iron, a telephone, and a piano.) Each object should be presented to the child and the following encouragement should be repeated once per object.

"Tell me more about it."

The rater should make note of any facial expressions, postures, or other movements used to convey meaning.

**Task E: Object Manipulation**

Immediately following Task D, the rater should say:

"You have done very well in explaining the things, and now you may play for a while."

The rater then puts the four toys shown to the child in Task D on the table and says:

"Let's put here the toys I have shown you before."
On the other table, the rater puts the second set of toys. These are toys the child has not seen and include a truck, a red board with removable screws and flaps, a set of barrels that can be inserted into one another, and a kaleidoscope. The rater says:

"Here we have more things. Let's put here the toys you have not seen before."

The rater then asks:

"With which toys do you want to play, with these or with these?"

The rater records the child’s choice and the time interval (in seconds) between the end of the experimenter’s question and the child’s choice.

In order to minimize distractions, the rater then removes the set of toys the child does not choose. Then the rater sits down behind the one-way mirror in the corner of the room to observe and rate the child’s manipulations of the toys. The child is allowed to play with the toys for ten minutes.

The rater records the order and duration in which the objects were handled. Each manipulation is classified into one of the following categories on the score sheet.

(1) Inspective manipulations—takes object in hand and looks at it, mostly while turning it around.

(2) Customary use manipulations—manipulates object in the manner that is most common for that object, e.g., plays phoning and listening with the phone, plays tones on the piano, or views the image in the kaleidoscope.
(3) Exploratory manipulations—exploring the manner in which the object operates or is structured, e.g., attempts to loosen or detach some fixed part of the object, attempts to take the object apart, handles various moving parts, etc.

In the second part of the task, the rater turns on the tape recorder, returns to the child, and says.

"Well, time is running short and we will have to stop. But before you go, I am sure you would like to know some things about these toys. Ask me anything you want to know and I will tell you or show you."

If the child does not ask, the rater says:

"Do not be shy. Many children ask me questions about these toys."

Questions asked by the child after these instructions will be considered spontaneous and assigned a weight of two points each. If the child did not ask any spontaneous questions, the rater should encourage him by pointing out the toys one by one and saying:

"Do you want to know something about this?"

Questions asked by the child after this encouragement will be considered encouraged responses and assigned a weight of one point each.

The same procedures should then be repeated with the second set of toys with which the child has not played.

Scoring

After the child leaves the examining area, the rater completes each section of the scoring sheet in the following manner.
**Task A**

The rater completes the score sheet by:

1. Looking at the stimulus cards and determining whether the right or left stimulus of each pair was the simple or complex.

2. Transferring the amount of time spent viewing each stimulus to the appropriate simple or complex designation.

3. Computing the difference in time between viewing the complex and the simple stimulus in each pair.

The rater should then compute:

1. The mean time spent viewing the simple stimulus in each pair. This number should be recorded for Variable 1.

2. The mean time spent viewing the complex stimulus in each pair. This number should be recorded for Variable 2.

3. The mean time difference between viewing the complex and the simple stimulus in each stimulus pair. This number should be recorded for Variable 3.

The rater can use the information already recorded on the score sheet to determine the number of times the child switches his glance from the right to the left stimulus or vice versa in the course of viewing all of the stimulus pairs (Variable 4) and the number of pairs whose complex stimulus was viewed longer than the simple stimulus (Variable 5).

**Task B**

The rater completes the score sheet by counting the number of complex stimuli preferred by the child. This number should then be recorded for Variable 6. Next, the
rater should count the number of times the child switched his preference from a simple stimulus on one stimulus pair to a complex stimulus on another stimulus pair or vice versa. This number should then be recorded for Variable 7.

**Task C**

The rater counts the number of stimuli on which the child opens the flap with no picture and records this number on the score sheet for Variable 8. The rater counts the number of times the child switches from opening one flap to opening the other and records this number on the score sheet for Variable 9.

**Task D**

The rater listens to the tape and lists on the score sheet all of the different response units (units which communicate something about the object) that the child used to convey the meaning of all four objects. These response units should be counted along with any physical responses recorded (facial expressions, postures, etc.), and recorded on the score sheet for Variable 10.

Each of these response units should then be coded into one of the twenty-three meaning dimensions. Explanations for each of the meaning dimensions are presented after Task E. Discussion for the coding should be made jointly by the rater and the investigator. The rater should count the number of different meaning dimensions used to convey the
meaning of all four objects and this number should be recorded on the score sheet for Variable 11.

**Task E**

During the administration of the task the rater will have recorded the time interval for Variable 12.

The rater should complete the score sheet by:

1. Counting and recording the appropriate number of manipulations for Variables 13, 14, and 15.

2. Adding together all of the manipulations and recording this number on the score sheet for Variable 16.

3. Recording the amount of time spent exploring or manipulating all objects for Variable 17.

4. Listening to the tape, recording the spontaneous questions asked by the child on the score sheet, and counting the number of spontaneous questions asked by the child. This number should be multiplied by two.

5. Listening to the tape, recording the encouraged questions asked by the child, and counting the number of encouraged questions asked by the child. This number should be added to the score of the spontaneous questions to obtain the weighted index of the child’s questions. This sum is then recorded on the score sheet for Variable 18.

6. Averaging the teacher ratings and recording this average for Variable 19.

**Explanations of Meaning Dimensions**

The following explanations of the meaning dimension categories are taken from pages 1314-1318 of the Kreitlers’ article, "Dimensions of Meaning and Their Measurement,"
which was published in the December, 1968 issue of Psychological Reports (2).

Conceptually distinct categories:

The 13 groups, which form 13 conceptually distinct categories, are presented below in a descending order of frequency. The frequency was determined by computing the per cent of response units included in the category from the total number of response units yielded by all Ss in their responses to all stimuli.

The categories were the following.

1. Indication of the referent’s contextual allocation (34.44%), either in terms of the superordinate concept to which the referent belongs (24.79%) (e.g., love—a feeling which, etc.; democracy—a form of government which, etc.) or in terms of a concrete or abstract superordinate structure of which the referent forms a part (9.65%) (e.g., hand—is a part of the body; God—belongs to religion).

2. Indication of the referent’s function, purpose or role in the context of human life (15.61%): The indication may be stated either directly by describing the uses to which the referent may be and is usually put (e.g., newspaper—it serves to transmit information to many people), or more indirectly by describing the usual activity(ies) which the referent does or which may be done with it and which suggest its function (e.g., watch—it shows the time).

3. Indication of the referent’s place or domain of existence or application (11.89%): In the case of denotative terms this category includes reference to the referent’s usually geographic or topographic locus (e.g. sun—is situated in the center of the planetary system), while in the case of connotative terms it generally includes reference to the domain(s) in which the referent occurs or entities to which it applies (e.g., revolution—may happen in politics, in the arts, etc.; love—occurs between human beings).

4. Indication of the causes for the referent’s occurrence (7.31%): This category includes reference to necessary and/or sufficient conditions for the referent’s occurrence or existence (e.g., fatigue—it appears when there is a concentration of toxins in the blood and also after a great effort; letter—it has been invented because of the need of people to communicate in spite of distance).

5. Indication of what the referent consists of or what it includes (6.19%): This category includes reference to the material of which the referent
consists (e.g., sea—it is made of water) or to items or parts which constitute it (e.g., art—a general name for painting, music, etc., body—head, shoulders, feet, etc.). The latter is in fact identification of the referent as a superordinate concept of structure.

(6) Indication of the referent's manner of occurrence (5.57%), in terms of a series of acts, activities or operations characteristic of the referent as a process-dynamic event (e.g., eating—the food is put into the mouth, chewed, swallowed and forced down into the stomach where it is decomposed, etc; democracy—lists of candidates are published by parties, then people vote for them by inserting the ballot paper in the slit of a ballot box, then the votes are counted, etc.).

(7) Indication of the referent's sensory qualities (4.21%): This category consists of several categories which may be regarded as autonomous: indication of the referent's dimensions and size (1.41%), quantity, its form and shape (1.22%), its color(s) (.58%), its weight or heaviness (.20%) and its thermal (.20%), tactile (.20%), acoustic (.20%), olfactory (.20%), and taste qualities.

(8) Indication of consequences which result from the referent's existence or from a certain activity it does (3.96%): Regardless of whether the stated consequences refer to the human context or not, they do not imply the referent's function or purpose (e.g., loneliness—it may lead to mental disease; sun—it enables the growth of plants).

(9) Indication of the referent's action(s) (8.09%): As in category 8, the stated actions are not intended to represent the referent's purpose or role (e.g., animal—it moves, eats, reproduces and kills; government—it has the power to decide concerning state affairs and to execute its decisions).

(10) Indication of the referent's history or past development (2.47%), in terms of its ontogenetic or phylogenetic development (e.g., eye—is derived from the ectoderm) or historic forerunners (e.g., buying—the modern version of exchange), or the personal history (e.g., physician—is a person who after graduating from high school studied in a medical faculty at a university, etc.).

(11) Indication of the referent's temporal qualities (1.73%), i.e., the time at which it exists or existed and/or its temporal duration (e.g., happiness—it usually lasts only for several seconds; newspaper—it appears at least once a day).

(12) Indication of the referent's similarity or contrast to other referents (1.11%), (e.g., death—the
contrast of life; eternity—is like perfection for both are fictions).

(13) Evaluation of the referent (.68%) in terms of the positive-negative polarity (e.g., life—it is wonderful, law--most of it is bad and unjust).

The above categories proved sufficient to include 97.27% of all response units. The remaining 2.71% of the response units fell into several classes which were identified in another series of studies (described under the following heading, Symbolic Meaning) as categories of symbolic meaning.

Symbolic meaning categories:

(1) An exemplifying instance (22.37%), i.e., representation of meaning through concrete examples, such as an object, a phenomenon, an animal or a person, which serve to illustrate it as specimens of its connotation or as parts of its denotation (e.g., aggression--Egypt's president, Mr. Nasser; air--bad air, fresh air, perfumed air).

(2) An activity (4.21%), i.e., representation of the meaning through an activity which people may perform with or by means of the referent. The activity is not meant to reflect the referent's function or purpose. This category appeared exclusively in responses to denotative terms (e.g., water--to drink it; sun--you can sun yourself in the sun).

(3) An exemplifying situation (10.30%), i.e., representation of the meaning by describing a situation, a sort of a picture, which is richer than an exemplifying instance, may include some activity and has duration but lacks dynamism and development (e.g., loneliness--a man wanders alone; moon--a young couple walks in the moonshine; motherhood--a woman with a baby in her arms).

(4) A scene (9.40%), i.e., representation of the meaning through an unfolding situation or story, structured in a sceno-dramatic manner (e.g., despair--a man wanders in the desert, looking for water. Suddenly it seems to him that the desert ends behind the near hill . . . he hears a human voice, he feels a cool hand . . . he falls down on a shrub of thorns, he is wounded, he is too thirsty to cry).

(5) Bodily expression and movement (2.05%), i.e., representation of the meaning through a bodily or facial movement, gesture, posture or through an emitted sound, and the accompanying kinesthetic sensation(s). This category appeared exclusively in response to connotative terms (e.g., security--straightening of
posture and raising the head; pain—thrusting finger nails in one’s body).

(6) **Consequences** (5.40%), i.e., representation of the meaning through consequences, mostly humanly relevant or psychological, which the referent may bring about (e.g., fear—to lose direction, the inability to decide; love—patting from the beloved one who leaves you forever).

(7) **Sensation and feeling** (10.69%), i.e., representation of the meaning through the description of experienced sensations and feelings stimulated by the referent. The description may contain synesthetic elements (e.g., sadness—the coldness and heaviness of the internal muteness; truth—the brilliance of a wonderous bright light spreads itself within me; desert—fear, cold fear).

(8) **An interpretation** (11.30%), i.e., representation of the meaning through a general interpretation expressed in terms of abstractions (e.g., happiness—the not-to-be-found in the found; birth—emerging from the chaos into the world, which is yourself; a woman’s body—beauty).

(9) **A metaphor** (13.82%), i.e., representation of the meaning through an image—of some concrete phenomenon, object, situation or scene—which does not belong strictly to the term’s conventional spheres of connotation or denotation, and which illustrates one or more of the meaning’s aspects, viz, is related to it by means of an interpretation (e.g., sexuality—two icebergs on a marble plate, beneath which there is a boiling sea; life—a colored kerchief which disappears in the hand of a magician; teeth—a well-ordered class of pupils).

(10) **Symbol** (3.20%), i.e., representation of the meaning through a metaphoric image which contains the illustration of at least one implied contrast and the resolution of this contrast at the image level (e.g., cleverness—a "sunny" eye, the drawing of an eye with rays issuing from its iris, for cleverness is both absorption and irradiation; perfection—colorless transparent light, for it remains unseen but enables sight, and includes all colors so that even when they break through, it remains itself; point—the meeting, the convergence of the end and the beginning, death and the seed of creation).
VARIABLES USED IN MEASURING THE TYPES OF CURiosity

<table>
<thead>
<tr>
<th>Type of Curiosity</th>
<th>Variables</th>
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<tbody>
<tr>
<td>Manipulatory Curiosity</td>
<td>12. Time interval of choice</td>
</tr>
<tr>
<td></td>
<td>13. Number of &quot;inspecting&quot; manipulations</td>
</tr>
<tr>
<td></td>
<td>15. Number of &quot;exploratory&quot; manipulations</td>
</tr>
<tr>
<td></td>
<td>16. Total number of manipulations</td>
</tr>
<tr>
<td></td>
<td>X. Choice of new or familiar toys</td>
</tr>
<tr>
<td>Perceptual Curiosity</td>
<td>1. Simple stimuli-mean observation time</td>
</tr>
<tr>
<td></td>
<td>2. Complex stimuli-mean observation time</td>
</tr>
<tr>
<td></td>
<td>4. Switching glance-total number</td>
</tr>
<tr>
<td></td>
<td>7. Switching preference-total number</td>
</tr>
<tr>
<td>Conceptual Curiosity</td>
<td>10. Number of meaning values</td>
</tr>
<tr>
<td></td>
<td>11. Number of meaning dimensions</td>
</tr>
<tr>
<td></td>
<td>14. Number of &quot;customary use&quot; manipulations</td>
</tr>
<tr>
<td></td>
<td>18. Weighted index of questions</td>
</tr>
<tr>
<td>Curiosity about the Complex</td>
<td>2. Complex stimuli-mean observation time</td>
</tr>
<tr>
<td></td>
<td>3. Mean time difference between complex and simple stimuli</td>
</tr>
<tr>
<td>AdjuStive-Reactive Curiosity</td>
<td>8. Choosing the unknown-total number</td>
</tr>
<tr>
<td></td>
<td>14. Number of &quot;customary use&quot; manipulations</td>
</tr>
<tr>
<td></td>
<td>19. Teacher ratings</td>
</tr>
</tbody>
</table>

APPENDIX B

PRINT AWARENESS MEASURES
Level 1

Coca-Cola
Trade-mark®
CLASSIC

Level 2

Coca-Cola

Level 3

Coca-Cola
## SIGNS OF THE ENVIRONMENT

### Print Awareness Items

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Coca-Cola</td>
<td>2. Crest</td>
<td>2. Stop</td>
</tr>
<tr>
<td>5. Vanilla Wafers</td>
<td>5. Campbell’s Soup</td>
<td>5. McDonald’s</td>
</tr>
<tr>
<td>7. Crest</td>
<td>7. Texaco</td>
<td>7. U.S. Mail</td>
</tr>
</tbody>
</table>
## Signs of the Environment

### Sample Questions

<table>
<thead>
<tr>
<th>Questions</th>
<th>Purposes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Have you ever seen this before?</td>
<td>To determine if the child has had previous contact with the printed stimuli</td>
</tr>
<tr>
<td>B. Where?</td>
<td></td>
</tr>
<tr>
<td>C. What do you think that is?</td>
<td>To determine the child’s response to the printed stimuli</td>
</tr>
<tr>
<td>D. What do you think that says?</td>
<td></td>
</tr>
<tr>
<td>E. How do you know?</td>
<td>To determine why the child responded the way he/she did</td>
</tr>
<tr>
<td>F. Why did you say that?</td>
<td></td>
</tr>
<tr>
<td>G. What makes you think so?</td>
<td></td>
</tr>
<tr>
<td>H. What tells you that it says _____?</td>
<td>To determine what stimuli the child is responding to</td>
</tr>
<tr>
<td>I. Show me with your finger where it says _____.</td>
<td></td>
</tr>
</tbody>
</table>

Source: Goodman & Altwerger (1981, Appendix D.)
SIGNS OF THE ENVIRONMENT

Coding Categories:

1. **Appropriate**
   a. **Exact response**—Item is read exactly as in "Coca-Cola" for Coca-Cola. In an exact response, misarticulation may occur.
   b. **Alternate name**—"Coke" for Coca-Cola.
   c. **Partial identification**—"Campbell’s" for Campbell’s Tomato Soup.

2. **Generic/Specific**
   . . .Generic term given for an item which is specific to that generic class: "soap" for Ivory, soda for Coca-Cola.

3. **Parallel**
   Response is the name of an item of same general class.

4. **Related Concept**
   Conceptually related response: butter/milk; soap/Crest

5. **Function**
   Refers to how item is used: "brush teeth" for Crest

6. **Chaining**
   Suggesting a chain of thought moving from item to response: "good" for Campbell’s Tomato Soup

7. **Non-Print Related**
   Color; design; emblem

8. **Print-Related**
   Refers to letters; sounds

9. **Unrelated Response**
   No meaningful relationship to the item: "umbrella" for Coca-Cola
10. **Avoidance**

   "I don’t know," playing, changing subject, movement

11. **Uncodable or Discontinued**

   Loses interest, squirming, anxious behavior

Source: Goodman & Altwerger (1981)
## SIGNS OF THE ENVIRONMENT

**Level 1**

<table>
<thead>
<tr>
<th>Item</th>
<th>Child’s Response</th>
<th>Coding Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Stop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Coca-Cola</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Kentucky Fried Chicken</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. McDonald’s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Vanilla Wafers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Saltine Crackers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Crest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Dairy Queen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Child’s Response</td>
<td>Coding Category</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>9. Crayola Crayons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. U.S. Mail</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Texaco</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Oak Farms Milk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Campbell’s Soup</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Froot Loops</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX C

LETTERS TO PARENTS AND DIRECTORS
Letter to Preschool, Head Start and Child Care Center Directors

October, 1987

Dear

I am a doctoral student majoring in Reading and minoring in Early Childhood Education at North Texas State University. The purpose of my dissertation is to explore the relationship between curiosity and print awareness in four-year-old children.

Trained raters will administer a set of tasks to children on an individual basis in order to obtain a measure of their curiosity behavior as well as their awareness of print. I am requesting your assistance with this study by allowing me to include the children in your classes in selecting my sample. A coded system of identification will be used so that the children involved in the study will remain anonymous. The amount of time required of each child will be small. Information collected will be recorded as group data and I will be happy to share results with you.

I will contact you in the next few days to discuss your center's participation in this study and to answer any questions you might have. Thank you for your consideration of this request.

Sincerely,

Anita Estrada
Dear Parents:

I am a doctoral student at North Texas State University. The purpose of my dissertation is to explore the relationship between curiosity and print awareness in four-year-old children. A brief description of the study is enclosed for your reference.

It will be appreciated if you will give permission for your child to participate in the study. Your signature on the attached form is needed for granting permission. Please use the enclosed envelope for returning the permission form. Return it to your child’s center or school. If you have any questions, please contact me at: 629-6611, Ext. 4136. If you are unable to reach me, leave a message with the secretary.

Thank you very much for your help and cooperation.

Sincerely,

Anita Estrada
I hereby give consent to Anita Estrada, doctoral student at North Texas State University, to perform or supervise the following investigational procedure with four-year-old children in ________________________________.

The purpose of the dissertation is to explore the relationship between curiosity and print awareness in four-year-old children. In order to obtain the data, a set of tasks will be administered to the children in the sample by a trained rater. For the curiosity measure, children will be stating preferences for pictures and toys. They will also manipulate toys—objects and describe them. For the print awareness measures, the children will be looking at pictures and identifying them. They will also look at a storybook and interact with the rater while looking at the book. The tasks will be administered on an individual basis. There are no right or wrong answers to the tasks.

These activities will provide the information on the child’s print awareness and curiosity behavior. A trained rater will be observing and interacting with the child. Information on the development of the reading process in young children will be obtained. The information may then be used to help develop curriculum that builds on the strengths of young children, the naturalness of their learning and provide richer environments for their developing competencies in literacy. There are no discomforts or risks involved for the child. A coded system of identification will be used so that the children involved in the study will remain anonymous.

The amount of time required for administering the tasks to each child will be small. Permission letters will be sent to parents and only those children who have permission from parents will participate in the study.

______________________________
Director

______________________________
Date
1. I hereby give consent to Anita Estrada to perform or supervise the following investigational procedure:

The purpose of the dissertation is to explore the relationship between curiosity and print awareness in young children. In order to obtain the data, a set of tasks will be administered to the children in the study by a trained rater. There are no right or wrong answers to the tasks. Children in the study will, on an individual basis, be looking at pictures and identifying them, looking at a storybook, stating preferences for pictures and objects/toys, and manipulating and describing objects/toys. These activities will provide information on the child’s print awareness and curiosity behavior. A trained rater will be observing and interacting with the child. Information on the development of the reading process in young children will obtained that can help in providing developmentally appropriate programs for young children. There are no discomforts or risks involved for the child. A coded system of identification will be used so that the children involved in the study will remain anonymous. The amount of time required for administering the tasks to each child will be small. Consent for your child’s participation in the study may be withdrawn at any time, if necessary, without any prejudice to the child.

2. I have received a clear explanation and understand the procedure of the study. I understand the benefits to be expected from the study and that there are no risks or discomforts involved for my child. I understand that the procedure to be performed is investigational and that I may withdraw my consent for my child’s participation at any time. Having received this information and satisfactory answers to the questions I have asked, I voluntarily consent to the procedure designated in paragraph 1 above.

Date

Signature - Person(s) Responsible

Relationship
APPENDIX D

PERMISSION LETTERS
Ann E. Lauranzano is the pen name of Anita Estrada
January 22, 1988

Dear Ann:

I was pleased to hear from you, and I'm glad your work is going well. You certainly have permission to use the tasks of curiosity which I prepared for my doctoral study. I will be interested in hearing about your research and request that you keep me informed.

Best of luck.

Sincerely,

[Signature]

Martha M. Foote, Ed. D.

MF/bc
January 23, 1988

Ann Lauranzano
2412 Barbados Drive
Wichita Falls, Texas 76308

Dear Ms. Lauranzano:

In response to your letter of January 4, you can use the same material in your study; however, be certain to attribute them to the author.

If we can be of further assistance, please contact us.

Cordially,

Maggie Hammond
Staff Assistant
December 8, 1987

Ann Estrada Lauranzano
2412 Barbados Drive
Wichita Falls, Texas 76308

Dear Ms. Lauranzano:

You have permission to use my Signs of the Environment and Book Handling Knowledge tasks for data analysis and for inclusion in the appendix of your dissertation.

Please reference my work appropriately and I would appreciate an abstract or copy of a paper on your conclusions.

Sincerely,

YETTA M. GOODMAN
Professor of Education

YMG:tc
REFERENCES


