A STUDY OF THE RELATIONSHIP BETWEEN SELECTED LEARNING
STYLES AND ACHIEVEMENT OF KINDERGARTEN LANGUAGE
ARTS OBJECTIVES IN A LOCAL SCHOOL DISTRICT

DISSERTATION

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By

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The purpose of this study was to determine whether there is a relationship between the learning style of a kindergarten child and the level of achievement in language arts. The study was done at the request of the school district of a small community in north Texas, and it incorporated the total public school kindergarten population, 110 subjects.

Instruments were the Learning Style Inventory: Primary by Perrin, the Iowa Tests of Basic Skills, and an achievement test developed by the regional education service center. The LSI:P was administered to all students by one person while the two achievement tests were administered by individual teachers to their own classes. The children were divided into groups according to their rating on the LSI:P, using the Prescription Circle by Dunn and Dunn as modifier.

ANOVA and chi square analysis were utilized to compute frequencies and percentages at the .05 level to determine relationships between learning styles' group membership and attainment in language. A definite relationship was found
between a child's learning style and achievement on the language arts objectives. Indications were that the elements of motivation, persistence and responsibility, and perceptual mode preferred by the learner had strong relationship to success in achievement.

It was concluded that a relationship exists between the ability to conduct successful word analysis and a child's learning style. It was also determined that children of kindergarten age can self-report learning style as measured by the Learning Style Inventory: Primary.

It is recommended that longitudinal studies be conducted to discover if learning styles change with maturity. Other studies could be done on subgroups of the kindergarten population to find what impact preschool experiences, English as a second language, or sex of the child may have on the relationship between a child's learning style and achievement in language arts.
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CHAPTER 1

INTRODUCTION TO THE STUDY

Society has challenged the educational system so that the perceived need today is for "large numbers of people with high-level skills who like to learn" (Chance, 1987, p. 46). This statement refers to the increased number of people who are employed at tasks involving retrieval and manipulation of information. Many people working in these fields can expect to retrain repeatedly throughout their careers.

Naisbitt (1984) agrees, "The notion of lifelong learning is already replacing the short-term approach to education, whereby you went to school, graduated, and that was that" (p. 100). Now a working adult can expect to return to school on his own time or the company's time. The additional education may be specialized training or keeping abreast of new developments in the field.

The early years of life are critical to lifelong learning. If a young child's sense of delight in knowing things can be guarded and efforts expended in learning can be nourished, the child may enjoy learning throughout life. The problem is how to combine what the child learns with the concepts he needs to know.
Educators need good tools for helping a child accomplish learning the concepts; they cannot just assume the strategies the teacher has at hand will fit all the students. Many tools are available and noteworthy, but using them appropriately is vital (Bredekamp, 1987; Elkind, 1987).

A group of researchers at St. John's University developed an instrument to measure children's preference for ways of learning. The instrument is the Learning Style Inventory (Dunn & Dunn, 1978). By answering questions designed to provide information about how each individual learns concepts important to him or her, children, teachers, and parents are provided a profile of the child's learning style. The information is then used to fit learning episodes to the individual, and achievement is anticipated. This study was designed to extend the knowledge of the relationship between learning style and achievement.

Problem of the Study

The problem of this study was to discover the relationship between the selected learning styles of kindergarten children and the achievement of language arts objectives in a public school.
Purpose of the Study

The purpose of this study was to determine whether there is a relationship between the learning style of a kindergarten child and the level of achievement in language arts.

Research Questions

The following questions were addressed in this study.

1. Is there a relationship between learning style and achievement in language arts?

2. How do the elements of learning style correlate with the achievement of kindergarten children in language arts?

Learning Style Elements

Environmental Elements
silence versus sound
bright versus low light
warm versus cool temperature
formal versus informal design

Emotional Elements
motivation
persistence and responsibility
structure

Sociological Elements
learning alone
learning with adults
learning with peers

Physical Elements

perception

auditory
visual
tactile
kinesthetic

time of day or night
intake

mobility versus passivity

Language Arts Objectives

Listen to recognize alliteration
Listen to recognize onomatopoeia
Identify letters, shapes, and forms
Auditory discrimination of rhyming words
Oral vocabulary--supply missing word
Identify main idea of oral selection
Recall facts and details
Arrange events in sequential order
Distinguishing real and make-believe
Read/write initial consonants of words
Background and Significance

Importance of Cognitive and Learning Styles

Consider what happens when one hears an intriguing idea which is new. If further knowledge is important, one will bring to bear all the skills which have produced successful learning in the past. Through this application one discovers what is important about the subject. It is in this manner one continues to learn throughout adult life. New learning for an occupation, for relationships, and/or for recreation is part of each human's daily routine. How easily one learns about things important to a person is dependent on how well one has refined the abilities and understands the ways in which one learns.

Ways through which people gain knowledge have been of interest for a long time. Debates continue on how knowledge is gained and processed. Although there is broad agreement among researchers about the existence of an individual style of learning, there is basic disagreement on how to define the concept (Dunn, DeBello, Brennan, Krimsky, & Murrain, 1981). Though agreement on a definition for learning style has been difficult to determine, the National Association of Secondary School Principal's (NASSP) Task Force on Learning Style and Brain Behavior adopted the following definition in 1983.
Learning style is the composite of characteristic cognitive, affective, and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment. It is demonstrated by the pattern of behavior and performance by which an individual approaches educational experience. The basis of learning style lies in the structure of neural organization and personality which both molds and is molded by human development and the learning experiences of home, school, and society. (Dunn, Dunn, & Freeley, 1984, p. 2)

The definition of learning style by Carbo, Dunn, and Dunn (1986) is not so different from that of the NASSP Task Force. They define learning style as "the way that students are affected by their (a) immediate environment, (b) their own emotionality, (c) sociological needs, (d) physical characteristics, and (e) psychological inclinations when concentrating and trying to master and remember new or difficult information or skills" (p. 2). For the purpose of this study, the definition of learning style by Carbo, Dunn, and Dunn is used.

Because a child's learning style is not manipulative, the teacher must determine to fit the presentation of
material to the child in a manner which will allow the best integration of it, taking into consideration the way the child learns. This has been known as individualization and is very difficult to do in a classroom of 20 to 30 children. Recognizing how important the adaptation of instruction to the child is, Keefe (1979) states,

Learning style diagnosis opens the door to placing individualized instruction on a more rational basis. It gives the most powerful leverage yet available to educators to analyze, motivate, and assist students in school. As such, it is the foundation of a truly modern approach to education. (p. 132)

In a very practical sense, answers to whether a child can learn in noisy or quiet surroundings, in bright or dim lighting, in small group or one-on-one situations, on which perceptual mode the child relies the most and similar questions can guide our understanding of the child and how he learns. This knowledge can allow us to provide a learning environment which will be more compatible with the way the child learns.

Very little has been done in examining learning style in relationship to kindergarten age children. A doctoral study by Carbo (1980) analyzed the relationship between the modality preferences of kindergartners and selected reading
treatments as they affected the learning of a basic sight-word vocabulary. She found that children taught through their strongest perceptual modalities learned more easily and retained better than when taught through their secondary or tertiary strengths. Carbo's work deals with only the perceptual modes. Thus, the inclusion of other areas of learning style in the present study provides a further insight into a kindergartner's success in learning in relationship to the individual's learning style.

Significance of the Study

Teachers of young children must be able to match developmental needs, cognitive and learning style, and the curriculum. Attractive and well written programs that provide enough results to impress educators and parents with their efficacy abound. The concern is that they are indiscriminantly applied to the whole class, usurping time, and opportunities which children could use to build their own knowledge structures if they were allowed to learn using their own style. It is important to find some quantitative method of determining children's cognitive and learning style so they can be successful, eager learners. An analysis of each student could serve as a basis for improving instruction.
Definition of Terms

For the purpose of this study, the following definitions were used.

**Learning style** is "the way that students are affected by their (a) immediate environment, (b) their own emotionality, (c) sociological needs, (d) physical characteristics, and (e) psychological inclinations when concentrating and trying to master and remember new or difficult information or skills" (Carbo, Dunn, & Dunn, 1986, p. 2).

**Elements of learning style** are in the categories of environmental, emotional, sociological, and physical. They are listed from the Learning Style Inventory: Primary Test Form (Perrin, 1983).

**Environmental Elements**

- **Sound** is the contrast between a relatively quiet environment with children speaking quietly and an environment which is very, very quiet.
- **Light** is a contrast between a room with all the lights on and one with only daylight from the window.
- **Temperature** is a contrast in working conditions that are cool or warm.
- **Design** refers to the room arrangement. Contrast is made between working at a table or stretched out on a soft rug.
Emotional Elements

Motivation contrasts a child's good feeling about a paper because (1) teacher is pleased, (2) mother is pleased, or (3) the child is pleased.

Persistence and responsibility deal with difficulty in completing work begun.

Structure as indicated in the instrument is the difference between the teacher telling the child exactly what to do on an assigned task and the child determining for himself what to do next.

Sociological Elements

Sociological preferences contrast the choice of working alone, with adults, or with a group of friends (peers).

Physical Elements

Perception explores children's understanding of how they like to learn important things they want to remember. Choices offered are auditory--listening to it, visual--seeing it, tactile--putting together a model or puzzle about it, or kinesthetic--playing a game or roleplaying it.

Time refers to the time of day the child learns best. Reference is made to morning, early afternoon, or evening.
Intake refers to snacking during or after engaging in schoolwork.

Mobility contrasts sitting in one place and finishing work with moving around while doing work.

Language Arts Objectives are from the essential elements for kindergarten found in Chapter 75 of the Texas education code (Texas Education Agency, 1988), and these objectives are used as a curriculum guide.

Listen to recognize alliteration: i.e. all the words in a sentence begin with the same sound.

Listen to recognize onomatopoeia: i.e. the word names a sound.

Identify letters, shapes, and forms: i.e. find the other letter in the row that is like the first one.

Auditory discrimination of rhyming words: i.e. which picture in the row has a name that rhymes with ___.

Oral vocabulary-supply missing word: i.e. which picture is a picture of the word that would finish this sentence . . . .

Identify main idea of oral selection: i.e. choose the picture that shows what the story is about.

Recall facts and details: i.e. choose the picture in the row that shows something specifically mentioned in a short story just related.
Arrange events in sequential order: i.e. choose the picture that shows what happened first/last in the story just related.

Distinguishing real and make-believe: i.e. real—could happen in real life or make-believe—could not happen in real life.

Read/write initial consonants of words: i.e. choose the letter that stands for the sound you hear at the beginning of _____. 
CHAPTER 2

REVIEW OF LITERATURE

To some researchers, a learning style is the individual response to conditions under which the learner begins to process information (Canfield & Lafferty, 1970; Dunn, Dunn, & Price, 1979; Gregorc, 1979; Hunt, 1979; Keefe, 1979). To others, learning style suggests how individuals process information (Gagne, 1985; Kolb, 1981; Ramirez & Casteneda, 1974; Schmeck, Ribich, & Ramanaiah, 1977). The latter designation is more often referred to as cognitive style (Dunn, Dunn, & Freeley, 1984).

Cognitive Style

According to Webster (1981), cognition is "1. the act or process of knowing in the broadest sense; 2. an intellectual process by which knowledge is gained about perceptions or ideas" (p. 440). Many of the early psychologists who were interested in understanding mental events would be termed cognitive psychologists today. In the late 1800s, James (1890) defined psychology as the "science of mental life." Later Watson (1920) held that mental life could never be studied objectively. He proposed the view that psychology was the science of behavior. He argued it could be independently verified and that there was
much to be discovered in the field. Thus, until after World War II, "psychology of mental events" lay dormant.

Then, widespread use of intelligence testing during World War II increased an interest in discovering the way people organized concepts. Subsequently, it was noted that after a person's concepts were established; it was not known how those concepts were used to categorize new information.

Asch and Witkin at Brooklyn College (Biehler, 1974) believed individuals were either field dependent or were field independent. Field independent meant a person learned by differentiating new information from its background. Field dependent meant the new information was viewed within the context of the background. The researchers ultimately broadened their concept to become termed as analytic and global functions.

At the same time, Holtzman and Gardner (Biehler, 1974) at Menninger Foundation were researching cognitive style. They believed cognitive style to be a complexus of cognitive controls. Their research involved differentiation versus undifferentiation, leveling versus sharpening, flexible versus constricted control, and other factors of focusing the mind. Their research is still being used today.

Concurrently, Kagan and several colleagues (Biehler, 1974) at the Fels Institute were interested in discovering data on the relationship between analytic/reflective
responses and non-analytic/impulsive responses. They had found there was a link while working with individuals in their research.

While each group found there were different ways people learned important information, they also discovered that the method of integrating the information was not significant. All learned the material, using a method of learning which was compatible with the learner's personality.

These studies by Witkin (1954), Gardner, Holzman, and Klein (1959), and Kagan (1966) indicated the significance of individuals' preferences for the methods they used when they conceptualized categories. An important finding by the researchers was that the method displayed in the approach to categorization of stimuli reflected the interpersonal behavior of the individual. Thus, a linkage between the internal thought process and external behavior was empirically established (Kagan, Moss, & Sigel, 1973), giving the term cognitive style a more specific meaning. Since the 1960s, the term "cognitive style" has been broadened to include selection strategies, open mindedness, memory, cautiousness, and sensory modality preference (Keefe, 1979).

Flavell (1963), Bruner (1966), and Kolb, Rubin, and McIntyre, (1974) refer to two major dimensions of cognitive growth and learning. The primary dimension of cognitive growth is considered to be the dialectic tension between
abstract detachment and concrete involvement. The second major dimension is the active/reflective in which the learner actively tests hypotheses and reflectively interprets data (Kolb et al., 1974).

A theoretical basis for cognitive growth and learning which relates to and expands the dimensions given above has been provided by Jean Piaget. Piaget, a Swiss epistemologist, became interested in and researched the reasons children gave "wrong" answers to questions (Biehler, 1976).

Piaget has given us a refreshing look at the child as the architect of his own intellectual growth. He has determined that the main keys to children's mental growth are their own actions upon their surroundings through which they construct knowledge of their world. Further growth occurs each time a child is confronted with novelty; the process of incorporating the new knowledge into the known concepts provides the steps of learning. This happens as the child matures in age and in the breadth of experiences (Isaacs, 1972).

Piaget's concept discloses the twin roles of motivation and maturation seen in a child's cognitive growth. He asserts that the child is motivated by his need to resolve conflicts arising from evidence of his actions upon his environment, and from more mature perspectives newly
developed through recent experiences. Conflict resolution provides growth in learning, thus becoming a cycle of knowledge generated from within the child and constantly expanding (Isaacs, 1972).


From birth on, a child tries to make sense of the world, by extracting patterns from the surrounding confusion. These patterns will be modified many times over, as the learner gets more experience and "input," the raw material from which patterns can be extracted. . . . Patterns help the child to increasingly make sense of his or her world, but to act on that world, have some control over it, each child needs to build thousands of programs. . . . Learning can be defined in brain terms as the acquisition of programs. (p. 15)

Cognitive style has been of major interest to researchers since World War II when Thurstone and then Guilford (Keefe, 1979) began to identify factors of perceptual speed and flexibility. Interest has not waned in the years since that time, but there has been activity toward incorporation of the concept of cognitive style within a larger concept of learning style.
Research on Cognitive Styles

Cognitive styles are "information processing habits representing the learner's typical mode of perceiving, thinking, problem solving, and remembering" (Messick, 1970, p. 185). "Each learner has preferred ways of perception, organization, and retention that are distinctive and consistent. These characteristic differences are called cognitive styles" (Keefe, 1979, p. 8). Cognitive style deals with the process of cognition, telling how information is being processed. Some dimensions of cognitive style are listed.

Perceptual Modes

Perceptual modes are in three groups.

a. kinesthetic/psychomotor,
b. visual/spatial, and
c. auditory/verbal.

These perceptual modes develop from kinesthetic to auditory. In adults, all three modes function cooperatively, usually with one mode preferred above the other (Sperry, 1972).

Field Independence Versus Dependence

Field independent people experience things as disconnected from the background. Field dependent people are influenced by the context of the background (Witkin, 1954).
Constricted Versus Flexible Control

This dimension deals with an individual's susceptibility to distraction/distortion. Constricted control has high susceptibility to distraction. Flexible control finds it easier to concentrate despite distractions (Gardner, Holzman, & Klein, 1959).

Leveling Versus Sharpening

In memory processing, levelers tend to blur similar memories and merge new precepts with already established experience, tending to over-generalize. Sharpeners tend to magnify differences and hold separate their memories of prior experiences from current events, tending to over-discriminate (Kogan, 1976).

Conceptual Tempo

The difference in how rapidly an individual processes information and forms adequate hypotheses on a continuum of reflection versus impulsivity. Impulsives are likely to give the first answer which occurs to them, incorrect or not. Reflectives are more likely to consider alternatives and offer more reasoned responses.

Summary

To summarize, "styles are controlling mechanisms concerned with manner or preference of performance and are value differentiated" (Keefe, 1979, p. 8). That is, each
style has its own value in adapting learning to differing circumstances and individual's preference for a specific way of learning will dictate choices.

Learning Style

There are differing views on the definition of learning style, but there is widespread agreement on the existence of individual differences in learning. Canfield and Lafferty (1970) define learning style as academic, structural, and achievement conditions, content, mode of preferred learning, and expectation of performance level. Hunt (1979) defines learning style as a description of students in terms of those educational conditions under which they are most likely to learn and essentially describes the amount of structure individuals require. Dunn, Dunn, and Price (1979) state that learners are affected by their environmental, emotional, sociological, and physical preferences.

Although the definition of learning style used in this study is the one outlined by the Dunns, discussion on the differences between learning style and cognitive style by others in the field is enlightening. Keefe (1979), writer, editor, educator, and administrator, says, "Learning style and cognitive style have often been used synonymously in the literature although they decidedly are not the same. Learning style, in fact, is the broader term and includes cognitive along with affective and physiological styles" (p.
Kirby (1979), an investigator for the Ohio State University's National Center for Research in Vocational Education states, "One important difference between cognitive and learning style is the number of elements each addresses. Cognitive style usually focuses on a single dimension (while) learning style includes many elements which are not either/or extremes" (p. 45).

In the Learning Style Inventory which the Dunns and Price developed, the areas evaluated are labeled as elements. There are four elements with several stimuli within each element. In the first element, immediate environment, sound, light, temperature, and design preferences are the stimuli. The second element, emotionality, includes motivation, persistence, responsibility, and structure. The third element, sociological needs, includes how the learner likes to work: with peers, with a friend, with an adult, alone, or in a varied group. The fourth element, physical characteristics, includes the learners' perceptual preferences, need for intake, mobility, and time of day preferences (Dunn, Dunn, & Price, 1984).

Both the environmental and physical elements of the learning style are biological; they are genetically imposed by nature (Restak, 1979; Thies, 1979). These components of learning have to do with the perceptual modalities of the
learner. The modalities include auditory, visual, tactual, and/or kinesthetic perceptions. "They do vary at different stages of life, but the rate at which they develop or change is related directly to the individual's maturation and physical condition" (Dunn, 1984, p. 498).

During the 1960s, Wepman (1971) researched modality as related to reading. He determined that the visual and auditory processes developed at different rates and independently of each other. He was one of the early proponents of teaching through modality grouping while providing improvement for the less well-developed modes (Morency & Wepman, 1973).

These descriptions of cognitive style and learning style show how children may approach the large task of learning. Because of a young child's unique way of learning, preschools are expected to provide a varied curriculum and appropriate environments and experiences.

Research on Learning Style

Hunt (1978) defines one learning style characteristic as a need for structure, or as he theorizes, conceptual level. Conceptual level defines how much structure a student needs in order to learn best in an educational environment. Hunt (1979) has presented his conceptual levels (CL) as developmental, with the stages described as "increasing self-responsibility, increasing understanding of
oneself and others, and increasing capacity for considering alternatives" (p. 29).

Thies (1979) has approached learning style from brain research. His conclusion is that the environmental elements of learning style preference may have an impact on the reticular activating system which prepares the individual for learning. In considering physical factors, Thies makes reference to Luria's research on the second functional unit of the brain. Naming the temporal lobe as processor of auditory information, the parietal lobe as processor of tactile and kinesthetic information, and the occipital lobe as receiver of the visual information, he explains that the intersection of these three lobes is the site of intermodality processing. In this area, a dysfunction in any lobe could result in major dependence on a single perceptual mode to the detriment of the others.

At the core of every style must lie something so basic that it colors perceptions and behavior enough to produce the specific style of an individual. Entwistle's view is that the "something" must be the learner's motivation (Entwistle, 1981). He suggests three broad classes of motivation:

(a) a pure interest in learning,
(b) a need for self-worth coupled with the assumption one will fail, and
(c) a need for self-worth coupled with the assumption one will succeed.

In learning style, motivation is treated in the emotional elements.

Conclusions by Schmeck (1988) indicate that, to him, learning style is the product of information processing activities preferred by individuals when engaged in learning. The essence of those activities range from deep and elaborative to shallow, repetitive, and reiterative. Students should be encouraged to develop the elaborative learning style.

Language Arts for Young Children

The Texas Education Agency (TEA), authorized by the legislature, provided the educators of Texas with rules for curriculum (Texas Education Agency, 1988). These rules in Chapter 75 outline the essential elements of subjects taught at each grade level. These essential elements or goals, along with a minimum time allotment for each subject area, constitute the curriculum guidelines for Texas public schools. An additional statement from TEA encourages early childhood educators to involve their students in the learning process through verbal and active learning, and through observation, rather than pencil and paper activities.
Research based knowledge shows that children's literacy development proceeds best when "written language is kept whole and functional and meaningful. . . . This wholeness allows children to use all of their current knowledge in their efforts to understand written language" (Schickedanz, 1986, p. 118). Schickedanz's reference to wholeness of written language would include a child's social-emotional background for learning: the home/family and the school/peer relationships which foster the child's desire to communicate and which provide emotional safety for sharing personal experiences. Functional written language in a child's environment can only have meaning through interaction with others. Teale (1982) states that "the whole process of natural literacy development hinges upon the experiences the child has in reading and writing activities which are mediated by literate adults, older siblings, or events in the child's everyday life" (p. 559). The socialization process, therefore, affects literacy development. A study of one community and how it produced literate individuals has enhanced the knowledge base established by researchers in the field of literacy. Cochran-Smith (1984) found "the making of readers in this community was the result of a process of gradual socialization . . . occur(ing) partly because children were constantly exposed to and involved in literacy events as
part of their routine social interaction with adults, and eventually with one another" (p. 2).

Research for emerging literacy has been reported in educational journals and through lectures for about the last 10 years. The message of the researchers is clear and consistent--literacy is developmental. Holdaway (1979) regards literacy as being developmental and learned--a matter of language with many human dimensions. He considers it a highly complex, cultural matter.

Eisner (1982) added a broader scope when he wrote that literacy involved much more than an ability to read and write. He included all representations of meaning: visual, auditory, tactual, and kinesthetic. He believed that literacy develops through all disciplines such as art, music, literature, and other fields. To him, the concept of literacy is the "power to encode or decode meaning through any of the forms that humans use to represent what they have come to know" (p. xii). Thus, language arts for young children is social, developmental, cultural, meaningful, and representational.

The term literacy is used today to refer specifically to the acquisition of reading and writing ability in language arts (Schickedanz, 1986). If a person would visit several early childhood classrooms, he or she might find that each provides different experiences intended to help
children learn about written language. In Texas, the TEA has designated the reading and language arts curriculum as the major vehicle for teaching these abilities. Reading and language arts, as defined by the TEA, is that area of the curriculum dealing with instruction in meaningful oral and written communication. In Texas kindergarten classrooms, 60% of the teaching day is designated for this instruction.

In 1984, educators (Black, Puckett, Haws, Moberg, & Vernon, 1985) combined their knowledge and research, under the auspices of the National Association for the Education of Young Children (NAEYC) to generate a position paper on Developmentally Appropriate Reading Programs. Their view was that appropriate programs for kindergarten children made it possible for them to acquire the concepts and strategies needed to become successful readers. They designed a statement that outlined important distinctions between activities that allowed children to create representations freely from meaningful experiences and activities that limited children to stylized responses to teacher expectations. The emphasis on creative freedom allows children to explore the many ways of representation and the varied methods of recording and retrieving meaning. Throne (1988) has supported this view with her observation, "As children emerge into literacy, they begin to understand that reading is getting meaning from print and they become aware
of the different functions and uses of written language" (pp. 11-12).

Research on Literacy

Current research indicates children naturally get an early start in beginning to read and write when they are exposed to literacy experiences which people use for real-life purposes (Bissex, 1980; Clay, 1975; Cochran-Smith, 1984). In the beginning, reading and writing behaviors are different from those of adults, but young children formulate logical methods of communicating, although those methods are not necessarily conventional (Bissex, 1980; Black, 1980).

Learning about the accepted form of written language comes from using it in meaningful context (Schickedanz, 1978) and is dependent on oral language development through vocabulary and through listening to stories (Teale, 1985). Literature plays a very important part in helping children develop into good readers and writers (Teale & Sulzby, 1985).

Early childhood educators have applied the suggestions and findings of research to their language arts curricula. However, some children do not achieve the expected level. Holdaway (1979) suggests that the focus has been on teaching rather than on learning while Elkind (1986) writes, "The education of young children must be in keeping with their unique modes of learning" (p. 631). Thus, a legitimate
question is the question of how educators can help children become literate in a way that will accommodate the manner in which they learn. Knowledge of the manner in which children learn must first be understood.

In 1986, the National Association of State Boards of Education instituted a plan to help states develop new early childhood initiatives. The task force advocated "that learning occurs best when there is a focus on the whole child; that learning for children and adults is interactive, (and) that young children learn from concrete work and play, much of which is child initiated" (Schultz & Lombardi, 1989, p. 7). These principles form the base upon which the proposed future early childhood units of the nation will be built.

To implement these principles, the teacher might be aided in increasing students' achievement by knowing the cognitive and learning style of each child and how they affect each child's learning. The commitment of teachers, then, is to discover ways to facilitate the child's own efforts, once the cognitive and learning styles have been identified. Knowing the child well is essential to implementing the principles above.

Historically, many kindergarten children have been able to engage freely in concrete, active play at school. In recent years, the emphasis has changed to include structured
pencil and paper work involving the abstract symbols of reading such as the form and sound of the individual letters of the alphabet (Manning, Manning, & Kamii, 1988, p. 4). Such an approach allows little time for the development of the ability to inquire which is essential to early learning. Today, research shows better ways to support the child's natural method of learning (Elkind, 1981; Holdaway, 1979; Schickedanz, 1986). It may benefit today's children greatly if additional research into individual learning style could help chart the course of future planning for the classroom.
CHAPTER 3

METHODS AND PROCEDURES

Population

The population included in this study consisted of the entire kindergarten enrollment of a school district located in the north central area of Texas. Fully accredited by the Southern Association of Colleges and Schools and by the Texas Education Agency for grades kindergarten through grade 12, the school is situated in a small community of 3500 townspeople with a total enrollment of 1600 students for the year 1988-1989. The district busses 38% of its students from the surrounding rural areas to the school in town.

According to school facts and figures for 1988-1989, oil and gas companies provided the major tax base with rock-crushing plants being secondary sources. Budget sources were 67% local, 27% state, and 6% federal. Approximately $3,800 is spent on each student annually (Bridgeport Independent School District, Texas, 1988).

The elementary school enrollment for 1988-1989 was 720 in grades kindergarten through grade 4. With a state mandated teacher-student ratio of 22:1, there was a shortage of classrooms on the elementary campus; therefore, the kindergarten and one pre-kindergarten class were housed in an old square brick building on a separate campus.
The building in which the kindergarten is housed was built in 1929. In 1989 when the study was conducted, it had seven classrooms and another room which was used for breakfast as well as an extra classroom. An additional room was used for media, library, and teacher workroom. Two large playgrounds completed the campus.

The kindergarten enrollment was 120 students taught by six teachers and one aide. Each kindergarten class was composed of children from the community and surrounding areas. These children included those who had attended Head Start, pre-kindergarten, private kindergarten, and some children with no preschool experience. Approximately 18% of the kindergarten enrollment was learning English as a second language. The children were assigned to classes according to their birth dates.

Of the six teachers, Teacher C had taught a total of 15 years—10 years in early childhood special education, four years in kindergarten, and one year in a language/learning disabled classroom. Two teachers, A and F, had taught 10 years; Teacher A had three years of experience in kindergarten and Teacher F had 10 years experience in kindergarten. Two teachers, D and B, specialized in reading. Teacher D had taught a total of seven years, all in kindergarten while Teacher B had taught six years in kindergarten and part of another year in first grade.
Teacher E was teaching her first year. All six teachers had Texas kindergarten endorsements, having earned a minimum of 12 semester hours in early childhood education and/or child development to qualify for the endorsements.

Sample

The sample selected for this study consisted of the 120 pupils of the 1988-1989 kindergarten enrollment. The three tests selected for this study were administered to each child. Of the total population available, 110 kindergarten students were ultimately chosen for the study. Ten children were omitted from inclusion because of incomplete data.

Instrumentation

For the purposes of this study, the superintendent authorized the use of three instruments (Appendix A). Chosen were the Learning Style Inventory: Primary (LSI:P), a self-report inventory in which the subjects indicate preferences for ways to learn; the Iowa Tests of Basic Skills: Early Primary Battery/Cognitive Abilities Test (ITBS/CogAT), a standardized norm-referenced achievement battery; and the Regional Curriculum Cooperative/Management Mastery System (MMS), a regional achievement test based on the Texas essential elements (Appendix B).
Learning Style Inventory: Primary

The Learning Style Inventory: Primary (LSI:P) is a self-report instrument based on the Learning Style Inventory developed by Dunn, Dunn, and Price (1984) and designed specifically for use with primary age children (Appendix C). In the Manual for Administration, Interpretation and Teaching Suggestions, the author (Perrin, 1983) states, "This is the only instrument that has been developed to date that identifies how very young children absorb and retain information" (p. 1).

During the administration of the LSI:P, a picture is shown to a child by the administrator of the test who describes it, reading a script from the manual. The adult then asks the child questions to which the child responds by choosing one of two answers provided by the manual. The administrator then records the answer in a prescribed space on a chart (Appendix C). Several questions may be asked for each category. When all the categories are completed, the answers are totaled and a profile is made for each child.

There are four stimuli basic to the LSI:P. These are environmental, emotional, sociological, and physical. Each stimulus has a number of elements which define the characteristics of a student's preferred mode of learning.

The first stimulus has four elements: sound, light, temperature, and design. Sound refers to the contrast
between a relatively quiet environment where children speak quietly and an environment which is very, very quiet. Light is the contrast between a room with all lights on and one with only daylight from the window. Temperature contrasts working conditions that are cool or warm. Design refers to the room arrangement—contrasting work at a table or work stretched out on a soft rug.

Emotional elements include motivation, persistence and responsibility, and structure. Motivation contrasts a child's good feeling of accomplishment because (1) teacher is pleased, (2) mother is pleased, or (3) the child is pleased; a fourth designation provides for the unmotivated child's choice. Persistence and responsibility deal with difficulty in completing work. Structure is the difference between the teacher telling the child exactly what to do and the child deciding for himself what the next step will be.

Sociological elements contrast choices of working alone, with an adult, or with a group of friends. According to Dunn, Dunn, and Price (1979), it is important to identify how children learn socially as well as perceptually and then assign them to the correct type of grouping, methods, and resources.

The last stimulus, physical, has four elements. These include perception, time, intake, and mobility. Perception explores children's understanding of how they like to learn
important things they want to remember. Choices offered are
listening to it (labelled auditory), seeing it (visual),
playing a game or roleplaying it (kinesthetic), or putting
together a puzzle or model about it (tactile). Time refers
to the time of day the child learns best. Reference is made
to morning, early afternoon, or evening. Intake refers to
snacking during or after engaging in schoolwork. Mobility
contrasts sitting in one place and finishing work with
moving around while doing work (Perrin, 1983).

Iowa Tests of Basic Skills

The Iowa Tests of Basic Skills: Early Primary
Battery/Cognitive Abilities Test (ITBS/CogAT) was first
introduced in 1968 to measure basic abilities of children in
grades kindergarten through 3. Its stated intention is to
"assess the development of cognitive abilities related to
verbal, quantitative, and nonverbal reasoning and problem
solving" (Thorndike & Hagen, 1986, p. 1). The subtests have
been "constructed to appraise specific aspects of cognitive
development and . . . other important general cognitive
skills that were related to school learning and problem
solving" (p. 3). The results are considered useful in
determining readiness for learning and for diagnosing
strengths and weaknesses in performance of skills that may
be used as a partial basis for making instructional
decisions. The ITBS is a standardized test, most recently
"standardized in the fall of 1984, using a population of nearly 12,000 pupils per grade. . . . Spring norms were established on a representative subsample of approximately 2500 pupils per grade" (Hieronymus, Hoover, & Lindquist, 1986, p. 2).

The ITBS/CogAT is a multiple choice achievement test administered to a group of students and answered by filling in the selected "bubble." Sections used by the researcher included the Listening, Word Analysis, Vocabulary, and Total Language components. The national percentile scores in each section were chosen as best representative of the score achieved for comparison in statistical analysis.

Management Mastery System

To develop the Regional Curriculum Cooperative/Management Mastery System (MMS), employees in a north Texas education center invited professors from a nearby college to consult with them in writing a test for the curriculum within their region. The first version of the test was administered in 1979. The most recent test for reliability and validity was done in 1986-1987.

A major revision of the MMS was accomplished in 1984 to correlate the test with the essential elements mandated by the state of Texas in that year. Presently incorporated within the test are elements from 1B, 3A, 3B, 3C, and 4C (M. Shippman, personal communication, July 13, 1989).
The MMS is administered by the teacher to the whole group of students. The language arts portion of the test can be administered in two 20-minute periods or one 30-minute period. The child marks the selected "bubbles" for each item. There are 10 objectives, and each objective has four questions. The student must answer three of the four questions correctly to have mastered that objective. The booklets are electronically scored, yielding information to be used in planning instructional goals for each child.

Collection of Data

The school district prescribed the three tests described for the purpose of determining a profile of achievement for each student. The administration of the school district granted permission for use of the results in this study.

The Learning Style Inventory: Primary by Perrin (1983) was selected by the school district during fall, 1988, and administered in March, 1989. The kindergarten aide administered the inventory. She was employed by the school district and assigned to the kindergarten on an all-day basis. The 1988-1989 school year was her second year with the kindergarten. The children knew the aide and were quite at ease with her because she worked in each classroom 45 minutes a day. Thus, she was chosen to administer the LSI:P instrument because of her rapport with all the children and
because the instrument did not require a trained practitioner.

The Iowa Tests of Basic Skills were administered in April, 1989, and administered by each individual teacher to her own class in the regular classroom setting. The completed tests were sent to the testing company to be electronically scanned for composite information per child, per class, and per grade level.

The language arts mastery test was also administered by the individual teacher to her own students. This was done in early May, 1989, and sent to the regional service center to be electronically scanned during the summer. Results were received in August, 1989.

Grouping

The learning style properties as reported by the LSI:P whereby the members of the public school kindergarten population in a small north Texas community differed from each other provided a basis for grouping the children into three groups. Group membership was based on the clusters of learning style elements which form classifications of the Prescription Circle used by Dunn and Dunn (1978) to match learning style characteristics with teaching resources. Although this study does not include a teaching application, the use of the Prescription Circle as a valid grouping device was considered reasonable as it has been in use by
the Dunns since the early 1970s. Additional grounds for its use was provided by the fact that the results produced by the LSI:P are too subjective to be clustered by statistical methods.

The method of grouping was initiated by giving each of the 110 students included in the study population a three digit identification number. The first digit of the identification number was a number identifying the teacher of that child. The second and third numbers were determined by the student's alphabetical rank in the classroom. The student was then assigned to one of three groups by the identification number.

According to the classifications by Dunn and Dunn (1978), members of group one had the following characteristics:

1. persistent and responsible,
2. motivated,
3. self-structured,
4. worked alone, and
5. used all four perceptual modes easily.

Members of group two had these characteristics:

1. persistent and responsible,
2. motivated,
3. needed structure,
4. worked alone, and
5. used visual, auditory, and tactual perceptual modes.

Members in group three had these characteristics:

1. neither persistent nor responsible,
2. unmotivated,
3. needed structure
4. low perceptual strengths or tactual/kinesthetic preferences.

In determining appropriate placement, each student's number was recorded on a slip of paper along with relevant scores from the LSI:P. The slips of paper were individually read and assigned to group according to the score in each category.

Because the persistent/responsible characteristic was at the top of the list for determining classification on the Prescription Circle, that category was chosen as the first area to examine. Range of scores ascribed to persistence/responsibility were five to zero with five being high. The examiner accepted no score lower than a four in that category for assignment to group one. Group two was allowed a rating as low as a two, while the members of group three had some scores recorded at zero.

The second consideration was whether or not the child was motivated. Using the listed criteria of unmotivated as the determining factor for placement in group three, the
data were sorted for a five or four in the unmotivated column. All students having a score of four or five in this column were assigned to group three. Having lower scores did not exclude placement here, but a high score guaranteed placement. Groups one and two were assigned no fours or fives in the unmotivated category.

The third criteria being whether a child needed structure or had little need of structure, the data were divided again. Group one received no assignee who scored lower than a three in the category dedicated to little need for structure. Since a need for structure was a characteristic of both groups two and three, the remainder of the slips were allowed to remain in these categories.

The fourth criteria specified the child must be able to work alone in order to belong to group one or two. Therefore, the examiner searched for those scores reading no lower than a three in this category for placement in group one or two. Group three contained readings for two through zero with some few exceptions. These exceptions included nonpersistent/irresponsible children and those who did not show notable scores in this area.

The fifth criteria was the ability to use all four perceptual modes easily for placement in group one. Children who relied on tactual/kinesthetic modes exclusively
or had very low scores in other perceptual areas were to be considered group three material.

Group two was to be composed of those who showed a preference for all but kinesthetic modes. It seemed appropriate, then, to search for those children who were highly kinesthetic or tactual/kinesthetic for assignment to group three. After the slips for group three were withdrawn, the remaining slips were categorized as those whose perceptual strengths were evenly distributed or were high in visual or auditory. These were placed in group one as designated by the Prescription Circle. The remaining slips were examined for perceptual mode preferences as indicated by the scores and placed in group two. All groups were then scanned to discover any discrepancies in assignment. The completed groups contained 27 in group one, 61 in group two, and 22 in group three at final counts.

Analysis of Data

After grouping, relationships between learning style group membership and attainment in language were examined. In order to investigate these relationships with the scores from the Iowa Tests of Basic Skills, one-way analysis of variance was conducted to determine whether language achievement was differentially distributed among the students' learning style classifications. The dependent variable is a national percentile language achievement score
from the ITBS. One ANOVA was conducted for each of the ITBS' measures of language: Listening, Word Analysis, Vocabulary, and Total Language.

In order to study the relationships to language arts achievement as measured on the Mastery Management System, chi square analysis was conducted to determine whether mastery of specific language objectives was related to membership in the learning style group. This analysis was chosen for these tests due to the fact that mastery was reported as a dichotomous variable and, thus, was not amenable to ANOVA. One chi square analysis was conducted for each of the MMS kindergarten language objectives.

All statistical analyses were conducted at the 0.05 level of significance. Where a significance was discovered in the results of the analyses, additional investigation was conducted. The Bartlett-Box test was used to test for homogeneity of variance because of the unequal numbers in the groups. The Fisher multiple comparison test was employed as follow-up to locate the cause of significance.
CHAPTER 4

ANALYSIS OF DATA

The purpose of this study was to determine whether there is a relationship between the learning styles of kindergarten children and their level of achievement in language arts. The variables in the study were group membership as determined by scores on the Learning Style Inventory: Primary (LSI:P) and by attainment in language. Two measures were utilized for reporting language achievement. One is the Iowa Tests of Basic Skills (ITBS), a standardized achievement test used by the school district and utilized in this study to provide a stable base for comparison. The other is the Mastery Management System (MMS), a regional test based on the criteria in the Texas essential elements and developed by the regional education service center employees. The MMS was used by the district to test objectives which appeared in the district curriculum guide.

Membership in one of three groups was based on classification of the Prescription Circle used by Dunn and Dunn (1978). The Prescription Circle was employed as a grouping plan when the results produced by the LSI:P were found to be too subjective to be clustered by statistical methods.
After the groups were established and described, one-way analysis of variance was applied to the results of the Iowa Tests of Basic Skills to determine whether language achievement was differentially distributed among the students' learning style classifications. The group membership was the independent variable; the dependent variable was the language achievement scores from the ITBS.

One ANOVA was conducted for each of the ITBS' measures of language: Listening, Word Analysis, Vocabulary, and Total Language (which is a composite of the three subtests). Each ANOVA is reported beginning with the Total Language score.

Table 1 shows 110 subjects distributed among three groups indicating a difference in means far enough apart to yield a significant difference at the .05 level. Because

Table 1
Analysis of Variance of the Iowa Tests of Basic Skills
Language Achievement for Three Groups on Total Language Test

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>5212.60</td>
<td>2</td>
<td>2602.30</td>
<td>2.96*</td>
</tr>
<tr>
<td>Within</td>
<td>94135.95</td>
<td>107</td>
<td>879.77</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>99348.55</td>
<td>109</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*significant at .05 level
the groups held unequal membership numbers, the Bartlett was
applied to test for homogeneity of variance. This yielded a
variance of .08. Fisher's LSD multiple range test was
utilized and the difference seen in Table 2 was found to be
between group 2 and group 3.

Table 2

Results of the Multiple Range for Three Groups: ITBS Total
Language Test

<table>
<thead>
<tr>
<th></th>
<th>Group 3</th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>23</td>
<td>26</td>
<td>61</td>
</tr>
<tr>
<td>Mean</td>
<td>33.1</td>
<td>44.8</td>
<td>50.8</td>
</tr>
</tbody>
</table>

Group 1 (self-structured) and group 3 (teacher-
structured) are underlined to show that they did not differ
critically from one another. Group 1 and group 2 (group-
structured) did not differ greatly. As shown by Table 2,
the significance lies between group 2 (group-structured) and
group 3 (teacher-structured).

Having used the total language score to determine
whether a difference existed among the groups and thereby
discovering a significance, it was necessary to analyze each
of the subtests.
Table 3 shows no significance in the listening variable. It shows group means not far enough apart to allow a conclusion of significance. The difference does not lie in the listening subtest.

Table 3

**ANOVA of the Iowa Tests of Basic Skills Language Achievement Subtest for Three Groups on Listening Variable**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>3258.85</td>
<td>2</td>
<td>1629.42</td>
<td>2.03</td>
</tr>
<tr>
<td>Within</td>
<td>85672.32</td>
<td>107</td>
<td>800.67</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>88931.17</td>
<td>109</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4 shows the ANOVA results of the subtest for word analysis. Table 4 indicates a significant difference among means at the .05 level. Bartlett's test for homogeneity of variance revealed a reading of 1.343 with a p of .261. Results of the Fisher's LSD are presented in Table 5. A significant difference lies between group 2 (group-structured) and group 3 (teacher-structured) in the word analysis subtest.
Table 4

Analysis of Variance of the Iowa Tests of Basic Skills Language Achievement Subtest for Three Groups on Word Analysis Variable

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>6018.86</td>
<td>2</td>
<td>3009.43</td>
<td>4.14*</td>
</tr>
<tr>
<td>Within</td>
<td>77758.95</td>
<td>107</td>
<td>726.72</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>83777.81</td>
<td>109</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*significant at .05 level

The third subtest is achievement in vocabulary. Table 6 indicates the results of the ANOVA on the vocabulary subtest. Table 6 reveals no critical differences among means.

Table 5

Results of the Multiple Range for Three Groups: ITBS Word Analysis Variable

<table>
<thead>
<tr>
<th></th>
<th>Group 2</th>
<th>Group 1</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>61</td>
<td>26</td>
<td>23</td>
</tr>
<tr>
<td>Mean</td>
<td>59.5</td>
<td>51.5</td>
<td>40.8</td>
</tr>
</tbody>
</table>
Table 6

Analysis of Variance of the Iowa Tests of Basic Skills
Language Achievement Subtest for Three Groups on Vocabulary Variable

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>2563.19</td>
<td>2</td>
<td>1281.59</td>
<td>1.60</td>
</tr>
<tr>
<td>Within</td>
<td>85498.53</td>
<td>107</td>
<td>799.05</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>88061.72</td>
<td>109</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data Related to Research Question 1

Research question 1 asked, "Is there a relationship between learning style and achievement in language arts?"

To answer this question, the chi square test of independence was used to determine whether a relationship existed between group membership and mastery of language arts objectives for the 110 subjects. One chi square analysis was conducted for each of the kindergarten language objectives.

1. Listen to recognize alliteration
   $\chi^2 = .33$, $p = .84$

2. Listen to recognize onomatopoeia
   $\chi^2 = 5.38$, $p = .07$

3. Identify letters, shapes and forms
   100% mastery

Significance
None
Approaching
None
4. Auditory discrimination of rhyming words
   \[ \chi^2 = .31, \ p = .86 \]
5. Oral vocabulary--supply missing word
   \[ \chi^2 = 5.16, \ p = .07 \]
6. Identify main idea of oral selection
   \[ \chi^2 = 1.43, \ p = .49 \]
7. Recall facts and details
   \[ \chi^2 = 5.70, \ p = .06 \]
8. Arrange events in sequential order
   \[ \chi^2 = .39, \ p = .82 \]
9. Distinguish real and make-believe
   \[ \chi^2 = 4.65, \ p = .09 \]
10. Read/write initial consonants
    \[ \chi^2 = 2.15, \ p = .34 \]

Tables are presented for each of the objectives and mastery or non-mastery has been recorded for each group. Expected frequencies are given in parentheses with the observed frequencies in each cell of the contingency table for that objective.

The first objective measured by the chi square analysis was "listening to recognize alliteration." Results of the analysis are recorded in Table 7.
Table 7

2 x 3 Contingency Table on Mastery or Non-Mastery of MMS

Objective 1, Alliteration, by Three Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Non-Mastery</th>
<th>Mastery</th>
<th>Total N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6 (6.1)</td>
<td>21 (20.9)</td>
<td>27</td>
<td>24.5</td>
</tr>
<tr>
<td>2</td>
<td>13 (13.9)</td>
<td>48 (47.1)</td>
<td>61</td>
<td>55.5</td>
</tr>
<tr>
<td>3</td>
<td>6 (5)</td>
<td>16 (17)</td>
<td>22</td>
<td>20.0</td>
</tr>
</tbody>
</table>

\[ \chi^2 = .33, \ p = .84 \]

The second objective measured was "listen to recognize onomatopoeia." These results appear in Table 8.

Table 8

2 x 3 Contingency Table on Mastery or Non-Mastery of MMS

Objective 2, Onomatopoeia, by Three Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Non-Mastery</th>
<th>Mastery</th>
<th>Total N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6 (8.1)</td>
<td>21 (18.9)</td>
<td>27</td>
<td>24.5</td>
</tr>
<tr>
<td>2</td>
<td>16 (18.3)</td>
<td>45 (42.7)</td>
<td>61</td>
<td>55.5</td>
</tr>
<tr>
<td>3</td>
<td>11 (6.6)</td>
<td>11 (15.4)</td>
<td>22</td>
<td>20.0</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 5.38, \ p = .07 \]
The third objective (Table 9) measured was "identify letters, shapes and forms." On this objective, all students in the study population achieved mastery so statistics were not computed.

Table 9

2 x 3 Contingency Table on Mastery or Non-Mastery of MMS Objective 3, Identify Letters, Shapes and Forms, by Three Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Non-Mastery</th>
<th>Mastery</th>
<th>Total N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>27 (27)</td>
<td>27</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>61 (61)</td>
<td>61</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>22 (22)</td>
<td>22</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Statistics not computed, no comparatives.

The fourth objective measured was "auditory discrimination of rhyming words." Results appear in Table 10.
Table 10

2 x 3 Contingency Table on Mastery or Non-Mastery of MMS

Objective 4. Auditory Discrimination of Rhyming Words, by Three Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Non-Mastery</th>
<th>Mastery</th>
<th>Total N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10 (8.8)</td>
<td>17 (18.2)</td>
<td>27</td>
<td>24.5</td>
</tr>
<tr>
<td>2</td>
<td>19 (20.0)</td>
<td>42 (41.0)</td>
<td>61</td>
<td>55.5</td>
</tr>
<tr>
<td>3</td>
<td>7 (7.2)</td>
<td>15 (14.8)</td>
<td>22</td>
<td>20.0</td>
</tr>
</tbody>
</table>

$X^2 = .31, \ p = .86$

The fifth objective measured was "oral vocabulary—supply missing word." Results which show approaching significance appear in Table 11.

Table 11

2 x 3 Contingency Table on Mastery or Non-Mastery of MMS

Objective 5. Oral Vocabulary—Supply Missing Word, by Three Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Non-Mastery</th>
<th>Mastery</th>
<th>Total N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 (1.7)</td>
<td>26 (26.3)</td>
<td>27</td>
<td>24.5</td>
</tr>
<tr>
<td>2</td>
<td>0 (1.7)</td>
<td>61 (59.3)</td>
<td>61</td>
<td>55.5</td>
</tr>
<tr>
<td>3</td>
<td>2 (.6)</td>
<td>20 (21.4)</td>
<td>22</td>
<td>20.0</td>
</tr>
</tbody>
</table>

$X^2 = 5.16, \ p = .07$
The sixth objective measured was "identify main idea of oral selection." Results appear in Table 12.

Table 12
2 x 3 Contingency Table on Mastery or Non-Mastery of MMS
Objective 6, Identify Main Idea of Oral Selection, by Three Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Non-Mastery</th>
<th>Mastery</th>
<th>Total N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 (0.5)</td>
<td>27 (26.5)</td>
<td>27</td>
<td>24.5</td>
</tr>
<tr>
<td>2</td>
<td>1 (1.1)</td>
<td>60 (59.9)</td>
<td>61</td>
<td>55.5</td>
</tr>
<tr>
<td>3</td>
<td>1 (0.4)</td>
<td>22 (21.6)</td>
<td>22</td>
<td>20.0</td>
</tr>
</tbody>
</table>

$X^2 = 1.43, p = .49$

The seventh objective measured was "recall facts and details." Results appear in Table 13.

Table 13
2 x 3 Contingency Table on Mastery or Non-Mastery of MMS
Objective 7, Recall Facts and Details, by Three Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Non-Mastery</th>
<th>Mastery</th>
<th>Total N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 (1.2)</td>
<td>27 (25.8)</td>
<td>27</td>
<td>24.5</td>
</tr>
<tr>
<td>2</td>
<td>2 (2.8)</td>
<td>59 (58.2)</td>
<td>61</td>
<td>55.5</td>
</tr>
<tr>
<td>3</td>
<td>3 (1.0)</td>
<td>19 (21.0)</td>
<td>22</td>
<td>20.0</td>
</tr>
</tbody>
</table>

$X^2 = 5.70, p = .06$
The eighth objective measured was "arrange events in sequential order." Results appear in Table 14.

Table 14
2 x 3 Contingency Table on Mastery or Non-Mastery of MMS
Objective 8. Arrange Events in Sequential Order, by Three Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Non-Mastery</th>
<th>Mastery</th>
<th>Total N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4 (3.2)</td>
<td>23 (23.8)</td>
<td>27</td>
<td>24.5</td>
</tr>
<tr>
<td>2</td>
<td>7 (7.2)</td>
<td>54 (53.8)</td>
<td>61</td>
<td>55.5</td>
</tr>
<tr>
<td>3</td>
<td>2 (2.6)</td>
<td>20 (19.4)</td>
<td>22</td>
<td>20.0</td>
</tr>
</tbody>
</table>

X² = .39, p = .82

The ninth objective measured was "distinguish real and make-believe." Results appear in Table 15.

The tenth objective measured was "read/write initial consonants." Results appear in Table 16.
Table 15

2 x 3 Contingency Table on Mastery or Non-Mastery of MMS
Objective 9, Distinguish Real and Make-Believe, by Three Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Non-Mastery</th>
<th>Mastery</th>
<th>Total N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8 (4.4)</td>
<td>19 (22.6)</td>
<td>27</td>
<td>24.5</td>
</tr>
<tr>
<td>2</td>
<td>7 (10.0)</td>
<td>54 (51.0)</td>
<td>61</td>
<td>55.5</td>
</tr>
<tr>
<td>3</td>
<td>3 (3.6)</td>
<td>19 (18.4)</td>
<td>22</td>
<td>20.0</td>
</tr>
</tbody>
</table>

$X^2 = 4.65, \ p = .09$

None of the tests indicated enough discrepancy between the means to be considered significant. There seems to be a

Table 16

2 x 3 Contingency Table on Mastery or Non-Mastery of MMS
Objective 10, Read/Write Initial Consonants, by Three Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Non-Mastery</th>
<th>Mastery</th>
<th>Total N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 (2.9)</td>
<td>22 (24.1)</td>
<td>27</td>
<td>24.5</td>
</tr>
<tr>
<td>2</td>
<td>5 (6.7)</td>
<td>56 (54.3)</td>
<td>61</td>
<td>55.5</td>
</tr>
<tr>
<td>3</td>
<td>2 (2.4)</td>
<td>20 (19.6)</td>
<td>22</td>
<td>20.0</td>
</tr>
</tbody>
</table>

$X^2 = 2.15, \ p = .34$
definite relationship between a child's learning style and achievement on the language arts objectives.

Data Related to Research Question 2

Research question 2 states, "How do the elements of learning style correlate with the achievement of kindergarten children in language arts?" To answer this question, a review of the learning style elements selected for use in determining group membership is necessary. First on the list of elements important to membership selection was the persistent and responsible characteristic. The second characteristic was motivation. The third characteristic was the need for little or much structure. Sociological orientation was the fourth characteristic as the inventory indicated whether the student could work alone or must have adult supervision or peer support.

The fifth characteristic was the type of perceptual modes the child used while pursuing mastery of information. Important to the classification method was whether or not the child relied heavily upon tactual and/or kinesthetic modes (which signified a group three classification), or was able to use all modes interchangeably and easily (signifying a group one designation).

Reference to Tables 7 through 16 will show results of the application of the chi square tests of independence on percentage of mastery on each language arts objective by
each group. None of the analyses showed true significance in differences in group means, but three tables (8, 11, and 13) indicate analyses which approached significance.

**Summary of Table 8**

In Table 8, the objective was mastery of the ability to recognize onomatopoeia. Involved in the ability to recognize onomatopoeia is the need to understand the underlying concept of a word naming a sound. Perceptual modes utilized would be that of auditory and visual only. A child who relied on tactual or kinesthetic modes to process knowledge would be guessing at the answers here. The table showed a 50/50 ratio of mastery here within group three, a group which was designated as tactual/kinesthetic learners.

**Summary of Table 11**

Table 11 stated the objective was mastery of the ability to supply a missing word. The test required a child to look at a row of three pictures while the test administrator named each one. Then the statement is made to choose the picture of the word that finishes the sentence. Then the child must fill in a circle under the picture of choice. There are four questions in the category. The student must answer three of the four correctly to have mastered the concept. Again group 3 did not fulfill
expectations. There are five potential problems involved in this test item for the group 3 member.

Membership in group three specified those children who were unmotivated, neither persistent nor responsible, and who relied primarily on kinesthetic and/or tactual perceptual strengths. The first potential problem would be the need for the student to discover and stay with the correct row of pictures. This takes motivation and organization. The second problem would be whether or not the child had the ability to visually and auditorily recognize the pictures as they were named. Group three was selected because they relied on tactual and kinesthetic modes. Their visual and auditory perceptual strengths tend to be very low and not their primary modes.

The third problem deals with their ability to abstract and their motivation to do so. To answer the question, the child must mentally insert the pictures seen in the row of choices into a mental picture of the sentence just heard. Then the resultant process of elimination of the improper choices as well as acceptance of the proper choice must be done. The fourth obstacle would be correctly signifying the correct answer by filling in one of three circles in that row. Fifth, the child would need to be well-motivated to continue the task after 16 previous questions have already
been done with no feedback as to whether there is success or not.

Given the characteristics of the group in question, Table 11 statistics are showing a result of the relationship of a child's learning style to mastery of the material presented.

**Summary of Table 13**

The seventh objective as shown on Table 13 was mastery of the ability to recall facts and details. Expected mastery was met in group 2. Group 1 exceeded expectations with 100% mastery. Group 3 showed a 9% drop in observed mastery from the predicted mastery.

In this test item, the student was required to identify pictures while the administrator named the items pictured, and the student listened to a three sentence story while looking at the pictures. At completion of the story, the child was to indicate the correct answer by recalling a single specified detail mentioned in the sentence story. If listening motivation was low and the child had a favorite food pictured in the row, the choice might center on that favorite food. This would also hold true for a child who did not depend easily on auditory or visual modes for perception.
As shown in other summaries, the group three child has a very low reliance on the auditory and visual perceptual modes and has very low motivation as well. These combined characteristics could account for the differences in the expected and realized observations of mastery of objective seven. It would seem that again, the relationship between a child's learning style and the amount of achievement was a strong one.

**Summary of Tests**

None of the tests revealed a significant difference between the means. Table 8, however, which recorded results of the second objective (listening to recognize onomatopoeia), Table 11 which recorded data on the fifth objective (supply the missing word), and Table 13 which recorded the results of the seventh objective (recalling facts and details) showed differences in means which approached significance. Because the ITBS results indicated a significance, coupled with the nearness to significance shown by the results of the chi square analyses, objectives two, five, and seven were explored further for explanation.

On Table 8, the difference was shown in mastery by group 3 on the second objective (listening to recognize onomatopoeia). Only 50% of that group achieved mastery which was 28% fewer than expected frequencies indicated.
Table 11 also showed a discrepancy between group 2 and group 3 in mastery and expected mastery of objective five (supply the missing word). Group 2 achieved higher mastery than expected and group 3 showed 7% less membership mastery than expected.

Table 13 implied an inconsistency in mastery of objective seven (recall facts and details) between expected and observed frequencies. Expected frequencies suggested a minimum of 21 group members would achieve mastery while only 19 were observed to have mastered the concept. This was a difference of 10%.

In each case, examination suggested reasonable explanations based on the differences in learning styles. Indications were that motivation, persistence and responsibility, and perceptual mode used by the learner had strong relationship to success in achievement.

Summary by Teacher

Dunn and Dunn (1978) encourage matching instructional materials and teaching methods with the student's learning style. They designed the Prescription Circle with the intention of correlating the characteristics so teachers could provide materials and methods so each would complement the other. Table 17 communicates the grouping according to teacher.
Teacher A had taught 10 years with three years experience in kindergarten. Teacher B had taught six years in kindergarten and part of another year in first grade. She had a specialization in reading. Teacher C had taught a total of 15 years with 10 years in early childhood special education, four years in kindergarten, and one year in a language/learning disabled classroom.

Teacher D had taught a total of seven years, all in kindergarten. Her specialization was in reading. Teacher E was teaching her first year. Teacher F had 10 years experience in kindergarten.

None of the teachers had reported a teaching style nor had they communicated in any specific way their management.
style. Using only their experience as stated, Table 18 shows the results.

According to the matrix, teachers A and E recorded the highest success rate with their classes with none of the percentages dropping below the 80% mark. Only teachers D and E have 100% of their class recorded in the study. All teachers, however, had an average daily attendance of 19 to 20 students.

Table 18

Objectives Mastered by Teacher

<table>
<thead>
<tr>
<th>Objective</th>
<th>Teacher (Matrix items are % mastering)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>1</td>
<td>94</td>
</tr>
<tr>
<td>2</td>
<td>94</td>
</tr>
<tr>
<td>3</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>83</td>
</tr>
<tr>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>100</td>
</tr>
<tr>
<td>7</td>
<td>94</td>
</tr>
<tr>
<td>8</td>
<td>94</td>
</tr>
<tr>
<td>9</td>
<td>89</td>
</tr>
<tr>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>Student N</td>
<td>18</td>
</tr>
</tbody>
</table>
CHAPTER 5

SUMMARY, FINDINGS, CONCLUSIONS, IMPLICATIONS
AND RECOMMENDATIONS

Summary

The purpose of this study was to determine whether there is a relationship between the learning styles of kindergarten children and their level of achievement in language arts. The instruments used were the Iowa Tests of Basic Skills (ITBS), a standardized achievement test; the Mastery Management System (MMS), a regional achievement test based on the school district's curriculum guide which incorporated the state-mandated rules for curriculum; and the Learning Style Inventory: Primary (LSI:P), a self-report inventory of preferences for ways of learning. The population for the study was the entire public school kindergarten consisting of 120 students.

Administrative permission was given for using the results of the tests which were administered in the spring of 1989. One hundred and ten students were ultimately included in the study, the omissions being those subjects on whom data was incomplete. These 110 students were grouped according to their scores on the LSI:P using the categories
found in the Prescription Circle by Dunn and Dunn (1978) as determiners. Frequencies and percentages were computed to report the comparisons shown by the tests. The analysis of variance produced a significant difference between the means for groups two and three. Further examination showed the difference to be in the subtest for word analysis in the ITBS. The chi square test of independence which was applied to the MMS measurement of mastery of objectives by the kindergartners yielded no actual significant differences among the means on any test, but on three tests the differences did approach significance.

Findings

This study was done to explore relationships, to assess differences among variables, and to look toward patterns that may lead to further worthwhile research. The following findings resulted from this study.

1. Kindergarten children can report their preferences for the ways they learn when asked. Upon examination, their reported preferences endured testing and appear to be stable.

2. No significant relationship was found between language achievement through listening and the learning style of three kindergarten groups.
3. No significant relationship was found between language achievement in vocabulary and the learning style of three kindergarten groups.

4. A significant relationship was found between language achievement in word analysis and the learning style of three kindergarten groups.

5. No significant relationship was found between the ability to recognize alliteration and the learning style of three kindergarten groups.

6. A relationship approaching significance was found between the ability to recognize onomatopoeia and the learning style of three kindergarten groups.

7. No significant relationship was found between the ability to identify letters, shapes, and forms and the learning style of three kindergarten groups.

8. No significant relationship was found between the ability to discriminate rhyming words and the learning style of three kindergarten groups.

9. A relationship approaching significance was found between the ability to supply missing words using oral vocabulary and the learning style of three kindergarten groups.

10. No significant relationship was found between the ability to identify the main idea of an oral selection and the learning style of three kindergarten groups.
11. A relationship approaching significance was found between the ability to recall facts and details and the learning style of three kindergarten groups.

12. No significant relationship was found between the ability to arrange events in sequential order and the learning style of three kindergarten groups.

13. No significant relationship was found between the ability to distinguish between real and make-believe and the learning style of three kindergarten groups.

14. No significant relationship was found between the ability to read and/or write initial consonants and the learning style of three kindergarten groups.

Conclusions

The following conclusions are based upon the findings from this study.

1. Children of kindergarten age can self-report learning style as measured by the Learning Style Inventory: Primary.

2. Categories on the Prescription Circle by Dunn and Dunn (1978) provide a viable grouping method.

3. There is a relationship between the ability to conduct successful word analysis and a child's learning style.

4. Although not significant at .05 level, there is an indication that a relationship exists between a child's
learning style and the ability to recognize onomatopoeia, the ability to recall facts and details, and the ability to supply a missing word for a sentence.

Implications

The following implications are suggested from an analysis of the data and from prior research.

1. Through observation or formal testing, teachers of young children must discover a child's learning style early in the year and align teaching strategies to provide success to all children.

2. Provide kindergarten students an opportunity to interact with learning materials that involve all perceptual modes.

Recommendations for Further Study

The following recommendations for further study are based on this study.

1. A study should be done which would include teaching style, a variable not addressed in this study.

2. No effort was made to subgroup the kindergartners according to preschool experiences, English as a second language, or sex. Further studies may want to sample or match for these variables.

3. Longitudinal studies should be done to see if learning styles change with maturity. If a child can learn
best in one perceptual mode at kindergarten age but changes to another perceptual mode as the major avenue of learning when in first grade, it would logically follow that methods and materials of a teacher in each grade would differ also.

4. In observing students while they were answering achievement test questions, it was noted the children used a number of skills that are developmentally acquired. Unless the test is validated for the age group to which it is administered, the measurement may be of a child's maturity level rather than of the knowledge level.
APPENDIX A

PERMISSION FOR USE OF SUBJECTS AND TEST RESULTS
June 7, 1989

Dr. June Buhler  
College of Elementary Education  
University of North Texas  
Denton, Texas 76203

Dear Dr. Buhler:

In reference to the proposed study by Mrs. Billie Harp Waddle which will use a learning styles inventory, local mastery test, and ITBS scores, she has my approval to collect this data in our school system and use it in the publication of her dissertation.

This study should prove to be useful to our school system and the study design that she has employed should be useful to any school district that utilizes research to organize instruction.

Yours truly,

JOHN C. BROOKS, Ed.D.  
Superintendent  
JCB:z
June 22, 1989

Billie F. Harp
1245 Dallas Drive
Denton, Texas  76205

Dear Ms. Harp:

Your project entitled "Kindergarten Learning Styles" has been approved by the Institutional Review Board under Exemption Category #6 and is exempt from further review under 45 CFR 46.101.

If you have any questions, please contact me at (817) 565-3946.

Good luck on your project.

Sincerely,

Peter Witt, Chair
Institutional Review Board
APPENDIX B

ESSENTIAL ELEMENTS FOR KINDERGARTNERS IN TEXAS SCHOOLS
§75.22 English Language Arts

(a) English language arts, kindergarten. English language arts, kindergarten, shall include the following essential elements:

(1) Listening. Developing skill in attending to, responding to, and analyzing oral communications. The student shall be provided opportunities to:

(A) focus attention on a speaker without interrupting;
(B) listen to appreciate sound devices of rhythm, rhyme, alliteration, and onomatopoeia;
(C) listen carefully to instructions and important information; and
(D) respond to storytelling by drawing or painting.

(2) Speaking.

(A) Developing fluency in using oral language to communicate effectively. The student shall be provided opportunities to:

(i) engage in creative dramatic activities and nonverbal communication;
(ii) use a variety of words to express feelings and ideas;
(iii) speak clearly and at an appropriate rate; and
(iv) communicate effectively in one-to-one and small group situations.

(B) Speaking to accomplish a variety of purposes: informing, expressing, persuading, entertaining. The student shall be provided opportunities to:

(i) relate events from personal experience; and
(ii) present poems chorally.

(3) Reading.

(A) Using word attack skills to decode written language. The student shall be provided opportunities to:

(i) discriminate sound for each letter of the alphabet;
(ii) discriminate visual shapes, forms, and letters; and
(iii) understand the direction of conventional print.

(B) Developing vocabulary to understand written material. The student shall be provided opportunities to:

(i) relate experiences with appropriate vocabulary in complete sentences; and
(ii) supply missing words in oral context.

(C) Using comprehension skills to gain meaning from whatever is read. The student shall be provided opportunities to respond to storytelling or oral reading by:

(i) telling what the story is about;
(ii) recalling important facts and details;
(iii) arranging the events in sequential order;
(iv) distinguishing between real and make-believe; and
(v) retelling a story.
(D) Applying reading skills to a variety of practical situations. The student shall be provided opportunities to follow oral directions.

(E) Developing literary appreciation skills to provide personal enjoyment. The student shall be provided opportunities to:

(i) appreciate repetition, rhyme, rhythm, and alliteration;
(ii) respond to various forms of literature;
(iii) become acquainted with a variety of selections, characters, and themes of our literary heritage;
(iv) select books for individual needs and interests; and
(v) follow simple story line in stories read aloud.

(4) Writing.

(A) Using a variety of techniques to select topics and to generate material to write about those topics. The student shall be provided opportunities to recognize that everyone has experiences to write about.

(B) Developing skills in writing effectively for a variety of purposes, modes, and audiences. The student shall be provided opportunities to recognize that writing can entertain and inform.

(C) Applying the conventions of writing to produce effective communications. The student shall be provided opportunities to:

(i) recognize that conventions are used to help communicate to an audience;
(ii) recognize the nature of sound-symbol correspondence; and
(iii) recognize the conventions of writing—spaces between words, word order, and marks on pages other than letters of alphabet.

(5) Language. Developing skill in using the grammar of English for effective oral and written communication. The student shall be provided opportunities to use oral language in a variety of situations.
APPENDIX C

STUDENT PROFILE: LEARNING STYLE INVENTORY: PRIMARY
<table>
<thead>
<tr>
<th>STUDENT PROFILE: LEARNING STYLE INVENTORY: PRIMARY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
</tr>
<tr>
<td>----------</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>SOUND</strong></th>
<th><strong>Grade</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Not acceptable</td>
<td>1 1 1 1 1 /5</td>
</tr>
<tr>
<td>Acceptable</td>
<td>2 2 2 2 2 /5</td>
</tr>
<tr>
<td>RESPONSE</td>
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<tr>
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<td>Informal</td>
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<tr>
<td>Requires</td>
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<td>Needs Little</td>
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<td>Adult</td>
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<tr>
<td>Peers</td>
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<td>Afternoon</td>
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<td>Is</td>
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<td>Requires</td>
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<tr>
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REFERENCES


Carbo, M. A. (1980). An analysis of the relationships between the modality preferences of kindergartners and selected reading treatments as they affect the learning of a basic sight-word vocabulary (Monograph VI). (Doctoral dissertation, St. John's University).


Kirby, P. (1979). *Cognitive style, learning style, and transfer skill acquisition*. Columbus, OH: The Ohio State University's National Center for Research in Vocational Education. (ERIC Document Reproduction Service No. ED 186 685)


