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Evelyn Jane Claus

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THE RELATIONSHIP OF METALINGUISTIC AWARENESS TO READING ACHIEVEMENT IN FIRST- AND SECOND-GRADE CHILDREN

By

Evelyn Jane Claus

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ABSTRACT

THE RELATIONSHIP OF METALINGUISTIC AWARENESS TO READING ACHIEVEMENT IN FIRST- AND SECOND-GRADE CHILDREN

By

Evelyn Jane Claus

The purpose of this study was to explore the relationship between metalinguistic awareness and reading acquisition. The study population included 33 first-grade and 42 second-grade children. All were enrolled in regular self-contained classrooms.

Riddles were used to assess development of four types of metalinguistic awareness: phonological, lexical, surface structure, and deep structure. Riddles were presented orally, and subjects were scored on the ability both to retell and to explain the riddles. Retell was assumed to measure metalinguistic awareness at the access level. Scoring of subjects' ability to explain or identify the source of ambiguity was assumed to measure development of metalinguistic awareness at the level of conscious control. Reading achievement was measured using the Gates-MacGinitie Reading Tests. Partial correlations controlling for age were applied to the data to test the relationship between level and type-of-riddle comprehension and reading achievement scores.

Results indicated that metalinguistic awareness increased somewhat with age, but they were not consistent with a theory of developmental acquisition in the order of phonological, lexical, surface, and deep structure. Among the four types of metalinguistic awareness, the strongest relationships were between the ability to retell the four riddle types and reading vocabulary for first-grade subjects. Comprehension of deep-structure riddles proved to be the best predictor of reading vocabulary for this group, followed by phonological and surface structure, and finally riddles presenting lexical ambiguity.

It was concluded that the results support the theoretical perspective that some general ability to focus on the surface properties of language at the access level may be contributory, rather than prerequisite, to the task of reading acquisition. It was proposed that an interactive relationship may exist between the development of metalinguistic awareness and reading acquisition.

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CHAPTER I

INTRODUCTION

Efforts to identify and understand factors that may be prerequisite for successful acquisition of reading ability have led some researchers to consider the possibility of such a relationship between metalinguistic awareness and reading achievement. Fowles and Glanz (1977) suggested a relationship between metalinguistic awareness and reading ability in children in early elementary school. Other researchers, too, such as Holden and MacGinitie (1972), Johns (1979), Allen (1979), and Hirsh-Pasek, Gleitman, and Gleitman (1980), have found that relationships exist between metalinguistic awareness and literacy acquisition. This relational study was designed to examine further the relationships of specific levels of metalinguistic awareness and reading achievement.

Nature of the Problem

Current researchers and theorists have suggested that the development of some level of metalinguistic awareness is a prerequisite for acquisition of literacy. Mattingly (1979) described "speaking and listening as primary linguistic activities and reading as a secondary, rather special sort of activity that relies critically on the reader's awareness of these primary activities" (p. 133).

Cazden (1975) defined metalinguistic awareness as the ability to bring language to focal attention or to attend to language forms in and for themselves. She further stated that there are increasing arguments that metalinguistic awareness is at least very helpful, and perhaps critically important, in what may be considered the derived or secondary processes of reading and writing. Additionally, Elkonian (1970) asserted that literacy acquisition is dependent on some level of metalinguistic awareness in stating that phonological awareness "represents one of the most essential preconditions for . . . learning literacy" (p. 168).

The development of metalinguistic awareness of phonological, lexical, surface, and deep structure in children has been examined. Zigler, Levine, and Gould (1967), Papandropoulou and Sinclair (1974), Sutton-Smith (1976), and Cazden (1980) provided evidence of a developmental sequence of awareness among these levels. The sequence generally supported begins with development of sensitivity to phonological, then lexical, surface, and finally deep structure.

McGhee (1971a, 1971b, 1976) and Schultz and Horibe (1974) also supported the developmental aspect of the acquisition of metalinguistic awareness and established a relationship between the stages of metalinguistic awareness and cognitive functioning.

According to Ryan (1980), an essential feature of linguistic awareness is cognitive flexibility or the ability to decenter when necessary away from the most salient attribute of the message. She posited that control over linguistic forms as exhibited in various metalinguistic tasks plays a role in processing of print. She further hypothesized that additional research will indicate a stronger association between reading performance and word segmentation and sentence repetition than with more demanding tasks such as syntactic correction or articulation of language rules.

Although evidence has indicated a strong relationship between cognitive growth and the development of metalinguistic awareness, larger individual differences exist in metalinguistic ability than can be explained by cognitive development alone (Cazden, 1975). Furthermore, metalinguistic awareness is thought to be acquired less easily and less universally than the primary performances of listening and speaking (Cazden, 1975; Miller, 1972).

The relationship between learning to read and metalinguistic awareness is even less well understood. Studies examining the extent and nature of this relationship are sparse and have focused primarily on phonological awareness and, as in a study by Holden and MacGinitie (1972), on the child's concept of word. Johns (1979), too, found a significant relationship between children's conceptions of word boundaries and reading achievement.

Fowles and Glanz (1977) reported that "riddles have emerged as good indicators of the child's tendency to focus on the surface properties of language" (p. 451). Comprehension of riddles requires attending to two or more meanings simultaneously, which requires decentration or cognitive flexibility. Adequate understanding and explanation of a verbal riddle requires attention to language as an object. Their findings indicated a relationship between the ability of children in grades one to three to retell and explain verbal riddles and reading achievement. Probably due to the exploratory nature of the Fowles and Glanz study, a small sample of children was tested and the relationship was not firmly established.

The essential task in reading is getting meaning from the printed message. One aspect of determining the author's message is the weighing of denotations and connotations of words, as well as the interpretation of syntactic structure. Downing (1978) postulated that the young reader must rediscover the functions and coding rules of the written system. Additionally, their rediscovery depends on linguistic awareness of those same features of language.

Vygotsky (1962) emphasized the interrelationship between reading acquisition and development of metalinguistic awareness. Literacy depends on and in turn contributes to making previous nonconscious or tacit knowledge more conscious.

> If you ask a child to produce a combination of sounds, for example sk, you will find that its deliberate articulation of sound is too hard for him, yet within a structure, as in the word Moscow, he pronounces the same sounds with ease. . . . The child realizes for the first time in learning to write that the word Moscow consists of the sounds m-o-s-k-o-w and learns to pronounce each one separately. . . . (pp. 101-102)

In summary, there exists significant evidence supporting the developmental aspect of metalinguistic awareness and that individuals vary considerably in its acquisition. Additionally, cognitive development seems not to account fully for development of, or individual differences in, metalinguistic abilities. The relationship between reading achievement and metalinguistic ability is less well defined. Kirshenblatt-Gimblett (1976), Miller (1979), and Ryan (1980) are among those who have called for further investigation of the role of metalinguistic awareness in the acquisition of reading ability.

In reference to beginning reading activities, Ryan (1980) commented, "In these tasks, since meaning is obscure or irrelevant and utilization of structural cues is necessary in both metalinguistic tasks and reading, poor performance in one activity should predict poor performance in the other" (p. 55).

This study was an attempt to extend the understanding of the relationship between metalinguistic awareness and learning to read.

Purpose of the Study

The purpose of this study was to investigate the relationship of metalinguistic awareness and reading achievement in first- and second-grade elementary school students through correlational research. Specifically, the writer examined metalinguistic variables of phonological, lexical, surface, and deep structure as related to reading achievement variables of vocabulary and comprehension.

Research Questions

1.0 Will there be a relationship between Riddle Comprehension Test scores and age for first-grade subjects?

- 1.1 Will there be a relationship between Total Riddle Recall scores and age for first-grade subjects?
- 1.2 Will there be a relationship between Total Riddle Explanation scores and age for first-grade subjects?

1.3 Will there be a relationship between Total Riddle Comprehension scores and age for first-grade subjects?

2.0 Will there be a relationship between Riddle Comprehension Test scores and age for second-grade subjects?

2.1 Will there be a relationship between Total Riddle Recall scores and age for second-grade subjects?

2.2 Will there be a relationship between Total Riddle Explanation scores and age for second-grade subjects?

2.3 Will there be a relationship between Total Riddle Comprehension scores and age for second-grade subjects?

3.0 Will there be a relationship between Riddle Comprehension Test scores and Gates-MacGinitie Reading Tests Vocabulary scores for first- and second-grade subjects?

3.1 Will there be a relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects?

3.2 Will there be a relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects?

3.3 Will there be a relationship between Total Riddle Explanation scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects?

3.4 Will there be a relationship between Total Riddle Explanation scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects?

3.5 Will there be a relationship between Total Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects?

3.6 Will there be a relationship between Total Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects?

4.0 Will there be a relationship between Riddle Comprehension Test scores and Gates-MacGinitie Reading Tests Comprehension scores for first- and second-grade subjects?

4.1 Will there be a relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects?

4.2 Will there be a relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects?

4.3 Will there be a relationship between Total Riddle Explanation scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects?

4.4 Will there be a relationship between Total Riddle Explanation scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects?

4.5 Will there be a relationship between Total Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects?

4.6 Will there be a relationship between Total Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects?

5.0 Will there be a relationship between Riddle Comprehension Test scores and Gates-MacGinitie Reading Tests Total scores for first- and second-grade subjects?

5.1 Will there be a relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects?

5.2 Will there be a relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects?

5.3 Will there be a relationship between Total Riddle Explanation scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects?

5.4 Will there be a relationship between Total Riddle Explanation scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects?

5.5 Will there be a relationship between Total Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects?

5.6 Will there be a relationship between Total Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects?

6.0 Will there be a relationship between Phonological, Lexical, Surface Structure, and Deep Structure subtest scores and Gates-MacGinitie Reading Tests Vocabulary scores for first- and second-grade subjects?

6.1 Will there be a relationship between Phonological Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects?

6.2 Will there be a relationship between Phonological Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects?

6.3 Will there be a relationship between Lexical Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects?

6.4 Will there be a relationship between Lexical Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects?

6.5 Will there be a relationship between Surface Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects?

6.6 Will there be a relationship between Surface Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects?

6.7 Will there be a relationship between Deep Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects?

6.8 Will there be a relationship between Deep Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects?

7.0 Will there be a relationship between Phonological, Lexical, Surface Structure, and Deep Structure subtest scores and Gates-MacGinitie Reading Tests Comprehension scores for first- and second-grade subjects?

7.1 Will there be a relationship between Phonological Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects?

7.2 Will there be a relationship between Phonological Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects?

7.3 Will there be a relationship between Lexical Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects?

7.4 Will there be a relationship between Lexical Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects?

7.5 Will there be a relationship between Surface Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects?

7.6 Will there be a relationship between Surface Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects?

7.7 Will there be a relationship between Deep Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects?

7.8 Will there be a relationship between Deep Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects?

8.0 Will there be a relationship between Phonological, Lexical, Surface Structure, and Deep Structure subtest scores and Gates-MacGinitie Reading Tests Total scores for first- and second-grade subjects?

8.1 Will there be a relationship between Phonological Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects?

8.2 Will there be a relationship between Phonological Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects?

8.3 Will there be a relationship between Lexical Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects?

8.4 Will there be a relationship between Lexical Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects?

8.5 Will there be a relationship between Surface Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects?

8.6 Will there be a relationship between Surface Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects?

8.7 Will there be a relationship between Deep Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects?

8.8 Will there be a relationship between Deep Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects?

Definition of Terms

Metalinguistic awareness. Ability to reflect on language forms as objects in and of themselves as shown by students' ability to retell and explain phonological, lexical, surface, and deep-structure riddles presented orally.

Not just grammatical rules

Reading achievement. Ability to identify words and comprehend passages as measured by performance on the Gates-MacGinitie Reading Tests (Gates & MacGinitie, 1978).

Phonological ambiguity. Results when a phonological sequence can be interpreted in more than one way.

Example: Question--What day of the week is the best for cooking bacon?

Answer--Friday

Lexical ambiguity. Occurs whenever a given lexical item presents more than one possible semantic interpretation.

Example: Question--What has 18 legs and catches flies?

Answer--A baseball team

Surface-structure ambiguity. Occurs when the words of a sentence can be grouped in more than one way, providing different interpretations.

Example: Question--Why did the city boy go to the country?

Answer--He wanted to see the barn dance.

Deep-structure ambiguity. Results when two different underlying meanings are represented by a single surface structure.

Example: Question--What kind of animal can jump higher than a house?

Answer--Any animal. Houses can't jump.

Limitations

A limitation of this study was that the correlational design restricts inferences of causality. Partial correlation techniques were employed to control the influence of age to eliminate this variable.

Measures of metalinguistic awareness and reading achievement were limited by the reliability and validity of the instruments used, as well as the testing conditions. The reading tests were administered by the classroom teachers. The riddle-comprehension task was administered by the examiner, who was relatively unknown to the students, although all possible attempts were made to establish some familiarity and maximum rapport.

The number of subjects was limited by the time-consuming nature of the riddle-comprehension task because it was individually administered.

Generalizability is limited by the characteristics of the population from which the subjects were drawn.

Organization of the Remaining Chapters

Chapter II contains a review of the pertinent literature in the following areas: (a) the development of metalinguistic awareness, (b) the development of verbal-humor comprehension, and (c) the relationship of metalinguistic awareness and reading achievement.

Chapter III presents a description of the procedures employed in the study, including a description of subjects and instruments used. The design is presented in detail.

The findings of the study are reported in Chapter IV. This includes results of data collected and analyzed pertinent to each hypothesis.

Chapter V includes a summary of the investigation, implications, and recommendations.

CHAPTER II

REVIEW OF LITERATURE

Mattingly (1979) proposed that reading and writing are secondary activities dependent on awareness of the primary activities of speaking and listening. Included was awareness of phonological, lexical, and grammatical components of language. The interrelatedness of learning to read and the development of metalinguistic awareness was also emphasized by Vygotsky (1962) and Ryan (1980).

It has been generally accepted that a relationship exists between oral language development and reading acquisition. The nature of that relationship, however, is not fully understood. While children have acquired considerable competence in oral language use by the time they enter school, language development is not complete and continues through the school years (Loban, 1963; Polermo & Molfese, 1972). A longitudinal study was conducted by Loban (1963, 1966), following a high and a low language group from kindergarten to sixth grade. Subjects high in language ability were also high in reading ability. Flexibility within language patterns rather than mastery of the patterns was determined to indicate effectiveness and control of language.

The ability to reflect on language, to bring language to focal attention, constitutes metalinguistic awareness. The child who can think about language as an object of knowledge has developed some level of metalinguistic awareness and may be better able to comprehend language coded into print. Awareness of language seems to be a later and more variably developing linguistic ability.

The related literature is discussed from the theoretical perspective that metalinguistic awareness may contribute, or be a prerequisite, to acquisition of literacy. The first section of this review discusses the development of metalinguistic awareness. The next section reviews the development of verbal humor in its relationship to, and as a measurement of, metalinguistic awareness. Finally, research on the relationship of metalinguistic awareness to reading is discussed.

Development of Metalinguistic Awareness

Little attention is given by language users in daily communication to the form and structure of their language. The focus of attention is, instead, on the meaning of messages. Metalinguistic awareness was defined by Cazden (1975) as the ability to bring language to focal attention, to make language forms opaque and attend to them in and for themselves. It is the ability to attend to the form rather than the content of language. In children's play with language, Weir (1962), however, contended that in most cases the role of content was subordinate to linguistic form.

Several researchers have focused on the developmental aspects of metalinguistic ability. Mattingly (1979) hypothesized that "the degree of metalinguistic awareness varies considerably from person to person" (p. 144). It is also thought to be acquired less automatically, less universally, and later than the primary performances of speaking and listening (Cazden, 1975; Mattingly, 1979; Vygotsky, 1965).

A slow and gradual development of the concept of word at the level of metalinguistic thought was found by Papandropoulou and Sinclair (1974). The concept of word was studied experimentally with 102 children between the ages of four years, five months and ten years, ten months. Subjects were presented with a list orally and asked to indicate if each item was or was not a word. Subjects were then asked to explain each judgment. Finally, each subject was asked to respond to "What is a word, really?" and "How do you know whether something is a word?" Subjects were also asked to produce a long word, a short word, and an invented word. Results of the study indicated four discrete levels of metalinguistic development in the age range. At the first level, generally four to five years of age, no distinction was made by the children between words and the objects to which they referred. At this level, utterances were not regarded as symbolic. Letters, sounds, or features of words were not referred to by children until later levels.

A little distance between language and reality was evident in the second stage (five to seven years). At this level, nouns were offered by subjects when asked for a definition of word. Subjects admitted when probed that verbs were also words but denied articles and prepositions were words. At this stage, words began to have some properties of their own. Concept of word at this level included that of word as a label but only in a one-to-one correspondence with objects.

At the third level, children were capable of defining words as a part of the linguistic context. Among seven and eight year olds, meaning as a frame of reference appeared. Long and short words were characterized by the number of letters and syllables rather than size of the object as in the first or second stage. The concept of words as a function of their meaning rather than of the objects and events they represent appeared. At this third stage, however, subjects still exhibited some relationship between linguistic representation and reality. For example, temporal order of mention was equated with temporal order of reality.

At the fourth level, 11 year olds could consider words as elements of a larger linguistic entity. At this stage, words acquired autonomy, becoming meaningful units. They became a part in the grammatical sense, belonging to formal classes. Words were referred to by this group as being made up of letters and having meaning. For example, children were able to think of relations between signifiers. Words begin to have function as well as meaning.

The authors concluded that the concept of "word" is complex and develops slowly during the ages studied. They suggested a parallel in metalinguistic development and general cognitive structure as described by Piaget.

In contrast to their findings that four to five year olds made no distinction between words and their referents, other researchers have found some evidence of metalinguistic awareness at earlier ages.

Judgments of acceptability of correct word order, word order reversed, and semantically anomalous sentences were elicited from two and three year olds by de Villiers and de Villiers (1972). A total of eight children were selected on a voluntary basis from an advertisement placed in the Harvard University student newspaper. Subjects were asked to judge as right or wrong, sentences varying in syntactic acceptability such as "Brush your teeth" or "Teeth you brush." "Throw the stone" or "Throw the sky" are examples of target sentences varied in semantic acceptability. Subjects were asked to correct those sentences judged as wrong. Performance of subjects on judgment and correction tasks was correlated with each child's mean length of utterance. Results of the study indicated that the most linguistically advanced children in this age group were able to make a significant number of judgments and corrections of reversed-word-order imperatives. Appropriate judgments and corrections of semantically anomalous sentences were made by those children less developed linguistically. The findings indicated that in some children, metalinguistic awareness begins to develop a early as two and three years of age but that considerable variation exists. Additionally, the results indicated that awareness of semantic features develops before awareness of syntactic features. The method of selection and the small number of subjects, however, warrants viewing the results with caution and limits generalizability.

According to Clark (1978), in a review of observational studies, the first signs of metalinguistic awareness begin to appear at about age two. Among these early signs, Clark reported, are spontaneous correction of one's own speech including word form and surface structure, questioning about words and language in general, play with language particularly with sounds and rhyming, and judgment regarding social as well as structural appropriateness. She noted that from the beginning young children seem to have some awareness of both form and function, and awareness increases with age.

Gleitman, Gleitman, and Shipley (1972) studied the ability of two year olds to judge which sentences were silly among correct-order and noun- and verb-reversed sentences. Two of the three children offered corrections as well as judgments. Their findings agreed with those of de Villiers and de Villiers (1972) and Clark (1978), although the number of subjects was again extremely small.

Additionally, Slobin (1978, 1980) documented the development of language awareness in his daughter between the ages of two years, nine months and five years, seven months. Slobin stated that many of the aspects including self-correction, questioning about language, and comments about the speech of self and others appeared to develop between the ages of two and six. Awareness with the very young child, however, was emergent. At age three years, four months, Slobin's daughter was not able to clearly distance a word from its referent. From observation of young children's play with language, Weir (1962) concluded from recordings of her two and one-half year old's monologues that language becomes divorced from communicative intent in the spontaneous play with language at very early ages.

Although several studies have demonstrated evidence of early development of awareness to language, they have generally lacked sizable numbers of subjects. However, they have been in agreement with Levelt, Sinclair, and Jarvella (1980) that "there is an unmistakable connection between the criteria of developmental stage and explicitness: the older the child, the greater his facility to reflect upon language" (p. 4).

Using word awareness as a measure of metalinguistic ability, Holden and MacGinitie (1973) sought to determine whether there is a developmental sequence in acquisition of metalinguistic abilities and whether acquisition of these abilities is related to Piagetian operations. A Word Awareness Test, five Piagetian seriation tasks, a riddle interview, an IQ test, and a reading readiness or reading achievement test were administered to 100 kindergarten and first-grade children. Significant differences at the .01 level were found, with a 2 x 3 analysis of variance with repeated measures, between grade levels, types of awareness items, and interaction between them. Very few children were at the operational level on the seriation tasks who did not also achieve high scores on the Word Awareness Test, although many children who achieved high scores on the Word Awareness Test did not score at the operational level on the seriation tasks. The Riddle Interview proved very difficult for most children in the study. Findings supported a rapid increase in word awareness at approximately age six. Contrary to the studies discussed above, Holden and MacGinitie reported, "The results . . . corroborate findings of previous researchers that neither seriation operations nor metalinguistic abilities appear before the age of five for most children" (p. 7).

A later study of word awareness conducted by Johns (1979) presented auditory stimuli to 65 primary--grade children. The subjects were asked to identify the stimuli as one word or not one word. More than half of the children ages five years, six months to six years, five months failed to correctly judge a spoken word as a word. Although children six years, six months to eight years seemed to have an accurate concept of short words, some confusion regarding long words continued to be evident. Cognitive confusion of long spoken words continued, though improved, with children into the second and third grade.

Finally, Smith and Tager-Flusberg (1982) investigated metalinguistic awareness and language development in an effort to test the interactive hypothesis of metalinguistic awareness development. They contended that some metalinguistic awareness develops earlier than six or seven years of age as many studies have shown and that acquisition and development are not autonomous from general, primary linguistic development. They proposed that the development of each is influenced by and enhanced by the development of the other. Two measures of language development and six metalinguistic tasks were used with 36 three and four year olds.

Basic language-development measures assessed the child's knowledge of words and concepts and syntactic knowledge. Metalinguistic awareness was assessed on six tasks covering sound, word, and syntactic judgment. Their results clearly indicated that preschool children are able to make some metalinguistic judgments, and their ability to do so increases with age. They found no support for a sequence of acquisition among the types of metalinguistic tasks. Additionally, results strongly supported a relationship between metalinguistic and primary linguistic development in the preschool year. Smith and Tager-Flusberg concluded that results of their investigation suggest an interaction between language comprehension systems and metalinguistic systems.

There is agreement that acquisition of metalinguistic awareness is developmental. A close relationship between cognitive development and acquisition of metalinguistic awareness is also evidenced. However, findings in the study by Holden and MacGinitie indicated that, as Mattingly hypothesized, cognitive development does not perfectly predict development of metalinguistic awareness. Developmental changes have been supported particularly around the age of seven by studies employing larger numbers of subjects. It is on this basis that first and second graders were selected as subjects for this study. Efforts were also made to avoid problems of an extremely small sample size.

The research cited indicates a lack of agreement regarding the beginning point of acquisition of metalinguistic awareness. Small samples of nonrepresentational subjects in some studies or variation in tasks designed to measure ability to reflect on language may account for the variant findings. Additionally, use of linguistic terms such as "word" may be a source of difficulty. A major conclusion of many researchers does suggest that metalinguistic awareness may be relatively late in developing. For example, Papandropolou and Sinclair (1974), Ehri (1975), Downing (1975), de Villiers and de Villiers (1972), Scholl and Ryan (1975), Glutman et al. (1972), and Ryan (1980) reported the early primary years to be an age range during which significant growth in general metalinguistic ability occurs.

It is indeed unclear when acquisition of metalinguistic awareness begins. It is possible that some of the studies discussed may have provided examples of children both linguistically and metalinguistically precocious rather than representative of their age group.

A central concern is the issue of level of awareness of metalinguistic ability. Mattingly (1979) conjectured that simple access to linguistic principles may be the central factor in linguistic awareness, while consciousness has been proposed by others as central. The present writer interprets elicited imitation and judgment tasks as representative of access to linguistic principles, while explanation would require consciousness. Both are used in the present study in an effort to determine the relationship of degree of metalinguistic awareness to early reading achievement.

Another consideration is awareness of phonological, semantic, and syntactic aspects of awareness to language. Several researchers have found evidence of a developmental sequence in acquisition of these aspects. Review of research using riddle comprehension as a measure of metalinguistic awareness in the following section discusses support for this sequence in greater detail.

Development of Verbal-Humor Comprehension

Developmental psychologists have focused on production, appreciation, and comprehension of verbal humor as an index of cognitive growth. Verbal-humor study by psycholinguists has concentrated on measuring development of competence and awareness of language structure.

The cognitive congruency principle was advanced by Zigler, Levine, and Gould (1967). They hypothesized that an important aspect of response in the form of laughter and preference to verbal humor is the cognitive demand made on the individual. Cartoons at the upper limit of an individual's cognitive ability should evoke a greater degree of appreciation.

Cartoons grouped on the basis of difficulty were presented to 60 students. Subjects were ten girls and ten boys each in grades three, five, and seven. Cartoons previously rated as easy, moderately difficult, and difficult for each age group were presented to subjects individually. A facial-mirth-response score was obtained by rating the degree of smile or laugh. Comprehension scores and preference ranking were also obtained.

Mean mirth response for moderately difficult cartoons was higher than for easy cartoons ($p < .105$) and for difficult cartoons ($p < .01$). The mean mirth response for moderately difficult cartoons was also higher than for very difficult (impossible) cartoons ($p < .001$). The preference scores paralleled the mirth-response scores and indicated preference varied significantly as a function of difficulty ($p < .001$). Zigler et al. noted that there was a lack of symmetry in ease to difficulty and suggested that further study employ a group of easier cartoons. They concluded that subjects' pleasure could be assessed equally well measuring mirth or preference judgment. Considering the difficulty and possible subjectivity of scoring half versus full smile and laugh, it seems a measure of judgment, correction, or some response more easily and objectively scored should be used. Individuals also vary in their propensity to display reactions particularly with a relatively unfamiliar examiner.

Zigler et al. evaluated the results of the study as support for the cognitive congruency principle. Mirth and preference scores peaked in the level of intermediate difficulty at each of the three grade levels. Caution was offered in that determinants other than the factor of cognitive challenge could influence the magnitude of the mirth response. There seemed to be, according to Zigler et al., many instances when a child unable to comprehend a joke saw it as funny for reasons other than the correct one. For this and reasons cited above, the present study did not employ a measure of mirth or judgment response.

A series of studies by McGhee (1971a, 1971b, 1976) established a relationship between children's level of cognitive functioning within a Piagetian framework, and comprehension and appreciation of verbal humor. He focused on the period of transition from preoperational to concrete operational thinking.

McGhee (1971a) improved on the study by Zigler et al. Mirth scores were not used, and yes-no judgment was replaced with requesting subjects to explain why cartoons and jokes were funny and elicitation of what could be changed so that it was no longer a joke or cartoon. Admittedly, responses of this nature are more difficult and demanding than a yes-no response but eliminate greater scores obtained for incorrect reasons. Additionally, McGhee included a measure of cognitive development.

Two types of humor were presented to 30 boys at each level, five, seven, and nine years of age, in an attempt to relate cognitive resources present at various ages and the level or type of verbal humor the child is able to understand. Incongruity humor consisted of cartoons or jokes in which expectancy violations occurred at an abstract conceptual level. Novelty humor employed elements that violated expectancy based on subjects' physical experience. McGhee reasoned that use of logic was important in comprehension of incongruity cartoons and jokes. He predicted that preoperational children would demonstrate poorer comprehension of incongruity humor than concrete operational subjects. Further, preoperational level of functioning should be adequate for identification of discrepancies presented in novelty humor.

Subjects were tested with a set of 20 humor stimuli, four examples in each of five different classes: novelty cartoons without captions, verbal novelty jokes, incongruity cartoons without captions, verbal incongruity, and incongruity cartoons with captions. Four Piagetian tasks measured conservation of mass and weight. Presentation of humor stimuli was followed by queries concerning what made it a cartoon or joke, why it was funny, and what could be changed so that it would no longer be a joke or cartoon. The questions parallel identification, judgment, and correction used in studies of the development of metalinguistic awareness discussed in the previous section.

Pearson correlation coefficients were computed between total cognitive scores and mean comprehension scores for each of the five classes. Results indicated the relationship between cognitive scores and humor comprehension was dependent on both type of humor and age. No relationships reached a level of significance for either the five or nine year olds. Significant correlations were found for seven year olds for incongruity jokes ($p < .01$) and incongruity cartoons without captions ($p < .05$). Cognitive scores were significantly related to ability to remove humor only for seven year olds and only for incongruity humor ($p < .05$). As McGhee expected, significant relationships were found only for seven year olds who were somewhere in transition between the stages of preoperational and concrete operational thinking.

McGhee interpreted the results as support for the hypothesis that the ability to perceive incongruous relationships is dependent on the use of logic. The task of eliminating the basis of humor, he argued, requires the individual to decenter current perceptions. The principle of cognitive congruency advanced by Zigler et al. (1967) predicts that subjects who have acquired the level of operational thinking should find incongruity humor, which taxes newly acquired reasoning, funnier than novelty humor as the former would lie within the growing edge of their capacities.

McGhee reported, however, that his results failed to support the conclusions of Zigler et al. (1967), although use of dissimilar humor stimuli was offered as a possible explanation for the variant findings. The nature of task demands may have affected the results. Two of the five classes of humor stimuli required reading by the nine-year-old group and three included cartoons. It is possible that the presence of visual stimuli confounded with measurement of subjects' ability to focus on and comprehend the verbal humor. To eliminate possible effects of pictures or print, this examiner selected verbal humor to be presented orally.

In further investigation of the role of cognitive development in children's comprehension and appreciation of humor, McGhee (1971b) employed a different set of tasks. The same students who participated in the earlier study were the subjects. The purpose of the study was to explore other approaches in determining the role of concrete operational thinking in comprehension and appreciation of humor. Subjects were again presented with cartoons. Three tasks were presented. The first set consisted of six sequential cartoons which subjects were to arrange in correct order. McGhee reported that "the total humor content can only be determined upon successful integration of the separate units of information provided by successive parts of the cartoon" (p. 735). A matching task constituted the second set. One half of a cartoon was mixed with two other potential halves. Subjects were to select the one that correctly matched the stem half. No captions accompanied cartoons in the first two tasks. Each of seven cartoons comprising the third set was accompanied by three possible captions from which subjects were to select the funniest caption. Captions were read to five and seven year olds. Only one of the three potential captions for each cartoon created an incongruous situation. Cognitive tasks were the same as in the earlier study.

Significant relationships were found between cognitive scores and humor-comprehension scores in the first task ($p < .01$) and second task ($p < .05$) for seven year olds only. The relationship between humor-comprehension scores on the third task and cognitive scores was significant ($p < .01$) for nine year olds. A difference between age groups was demonstrated in ability to offer interpretive explanations. The analysis indicated primarily descriptive responses were offered by five year olds. Regardless of cognitive scores, nine year olds responded primarily with interpretive explanations. Significant relationships were found only for seven year olds. For this group, high cognitive scores correlated with interpretive explanations and low cognitive scores with mainly descriptive explanations ($p < .05$). For all tasks, comprehension was significantly correlated with age ($p < .001$). Results were reported as demonstrating that degree of acquisition of operational functions was significantly positively related to comprehension in sequential and matching tasks for seven year olds. Significance was not obtained for the caption-matching task until age nine.

McGhee concluded that more frequent interpretive explanations offered by more cognitively advanced seven year olds supported findings in the previous study. However, it is possible that in the first and second tasks, the more cognitively advanced nine year olds did not demonstrate greater comprehension of humor because a subject might arrive at a correct choice yet have no insight into why the cartoon was funny. Cognitive functioning did not, as with the earlier study, predict level of humor appreciation. The present study focused measurement on comprehension, eliminating any measure of mirth or appreciation.

In a later pair of studies, McGhee (1979), citing the multidimensional nature of concrete operational thinking, used jokes based on specific conceptual acquisitions associated with operational thinking in an effort to predict amount of effort required for assimilation of content of the jokes into subjects' existing cognitive structures. The first study focused on conservation of mass and weight. These jokes were termed conservation jokes as those subjects who understood conservation of mass were also comprehenders of conservation of weight. Subjects were 48 girls. First and second graders comprised a group of both conservers and nonconservers. Fifth graders and graduate students were all conservers of mass and weight. Prediction, judgment, and explanation responses were obtained for all subjects. Subjects were classified as conservers only if all responses were satisfactory.

In the first study a series of conservation jokes was presented to subjects. Jokes violating class inclusion were presented in the second study. Subjects were asked to rate the jokes on a five-point funniness scale. In addition, smiling and laughing were rated on a three-point scale by the examiner. The only significant trend in the first study occurred between first-grade conservers of mass and second-grade conservers of mass but not weight and funniness rating of conservation jokes ($p < .01$). Smile-laugh ratings proved not to be effective. Results of the second study also found a significant effect for funniness ratings of class-inclusion jokes ($p < .01$), consistent with predictions from the cognitive congruency principle. Again, smile-laugh ratings were ineffective. McGhee reported the findings of the two studies "provide the strongest support yet obtained for the cognitive congruency principle" (p. 423). Those children for whom the capacity for class inclusion was recently acquired demonstrated a greater appreciation of representative jokes than either children who had not yet acquired the concept or those who had possessed the capacity for some time.

Within a framework of the incongruity and resolution theory of humor, Shultz (1974) studied the development of comprehension and appreciation of riddles. Many riddles are based on some form of linguistic ambiguity, requiring reclassification or depending on multiple classification. Possible resolutions can be based on phonological, lexical, surface-structure, and deep-structure ambiguity.

Published riddles for children were analyzed and eliminated if content was judged as too difficult for the youngest subjects. Subjects included 15 girls and 15 boys from each of four grade levels: one, three, five, and seven. Subjects listened to a tape containing 30 riddles. Each of three tapes presented two riddles in original form, two resolution-removed, and two incongruity-removed forms of each of five types of riddles: phonological ambiguity, lexical, surface-structure, deep-structure, and other than linguistic ambiguity. Each subject was tested individually.

A five-point scale was used to provide a mirth-response rating. Subjects were then asked to explain what was funny about the riddle. Additional questions focusing on the two meanings were used to probe children's understanding if they were not able to fully explain the humor. Comprehension responses were scored on the basis of incongruity elements mentioned.

Based on mirth-response scores, subjects in grades three, five, and seven found the original form of the riddles funnier than altered forms ($p < .001$). All three forms were rated equally funny by first graders. First graders also had particular difficulty identifying the hidden meaning. Comprehension of resolution increased steadily with age ($p < .001$). Comprehension of incongruity increased through grades one, three, and five, and decreased in grade seven. Results strongly indicated transition from a stage of pure incongruity to a stage of resolvable incongruity between the ages of six and eight. No results were reported for responses by age to riddles based on different types of linguistic ambiguity.

Shultz and Horibe (1974) also reported results supporting a developmental theory in which a stage of appreciation of pure incongruity is followed by a stage of appreciation of resolvable incongruity for verbal jokes. Subjects for this study were 15 girls and 15 boys from each of grades one, three, five, and seven. As with the riddles in the previous study, jokes in their original form, with resolution removed, and incongruity removed for each of the four linguistic ambiguity scores and other than linguistic ambiguity were presented. Explanations of what was funny were obtained in addition to scoring of mirth responses.

Results strongly supported variations between the different resolution types on the hidden-meaning measure. Detection of phonological ambiguities occurred more often than hidden meanings of other types, and surface-structure ambiguities were detected more often than were hidden meanings of deep-structure ambiguities.

Further support for developmental trends in children's comprehension of riddles was found by Sutton-Smith (1976). Among six to eight year olds, he reported a shift from a stage of pure incongruity, which he referred to as the pre-riddle, to a stage of resolvable incongruity. Three major periods were typified in

Sutton-Smith's findings. The first is the preoperational period, when a child thinks of objects or sentences in a unidimensional way. However, he found that by grade three children can determine that a sentence, just as objects, can have two dimensions and words can have two meanings.

Schultz and Pilon (1973) reported no difference between detection of surface- and deep-structure ambiguities. The study assessed the ability of 6, 9, 12, and 15 year olds to detect various types of ambiguities. Sentences representing phonological, lexical, surface-, and deep-structure ambiguity were presented. Sentences with only one meaning were also included. Students were asked to explain what each sentence meant. Subjects then selected from two illustrations the one that depicted the meaning of the sentence and were to justify the choice.

Phonological ambiguities were detected more often by first-grade subjects than lexical or surface-structure ambiguities. A sharp increase in detection of phonological ambiguity was found in grade four and tapered in grades seven and ten. Not until grade seven were syntactic ambiguities detected with any frequency, with no improvement from grade seven to grade ten. A nearly linear improvement across grades was found for detection of lexical ambiguity. Detection of deep-structure ambiguity did not differ from detection of surface-structure ambiguity in this study.

Competence in verbal riddle comprehension was investigated in an exploratory study by Fowles and Glanz (1977). Four categories of riddles, based on criteria modified from Shultz and Horibe, were presented to children orally. No visual stimuli were included. Riddle categories represented ambiguity based on lexical, surface, and deep structure. Subjects were six children in grade one, four in grade two, and four third-grade students. Half were reading at or above grade level in reading, and half had been identified by their teachers as significantly below grade level.

Riddles were presented to each subject individually. Ability to retell the riddles was scored on a three-point scale. A three-point scale was also used to rate ability to explain what was funny about each riddle. Due to the small population of their study, Fowles and Glanz did not analyze and report differences in responses among the linguistic categories.

Results did not show an orderly acquisition of competence in riddle comprehension by grade. Ability to retell was not completely predictive of the ability to explain the riddles. There did appear to be some relationship between reading ability and riddle comprehension. These results were reported as tentative; "the relation between all aspects of language play and reading is in need of thorough study" (p. 440). Further studies employing larger numbers of subjects are needed.

Ability to detect linguistic ambiguity seems to develop at different rates depending on the type of ambiguity. Results reported by Shultz and Pilon (1973) and Shultz and Horibe (1974) indicated detection of phonological ambiguity appeared first, followed by detection of lexical and finally syntactic ambiguity. Although different verbal forms were used in the Schultz and Horibe and the Shultz and Pilon studies, the findings were generally consistent in suggesting differential roles of development of sensitivity or awareness to these linguistic aspects. The exact nature of the relationship between the development of humor comprehension and appreciation and aspects of cognitive development is not clear and warrants further research. The use of differing forms of verbal humor and differing demands of task-response requirements makes firm conclusions difficult. Measurement of appreciation seems at this point most complex and subject to variations of context and additional response demands. Appreciation-response measures were not included in the current study.

In summary, several studies have focused on the cognitive and linguistic aspect of humor development. It seems competence with riddles in particular requires coping with two or more meanings. This in turn requires decentration, which is very difficult before operational thinking. Riddles are generally familiar to children in the primary grades and are therefore part of their socio-linguistic experience. Additionally, riddles require focusing attention on the surface properties of language to even consider multiple meanings. Fowles and Glanz (1977) noted that "riddles have emerged as good indicators of the child's tendency to focus on the surface properties of language. Adequate explanation of a verbal riddle necessitates attention to language as a thing" (p. 451). Riddles have the advantages of being independent of additional linguistic or nonlinguistic context and of presenting a reasonably natural task setting.

Those riddles representing ambiguity based on lexical, surface, and deep structure in the Fowles and Glanz study were used in the current investigation. Additionally, four riddles with ambiguity based on phonological aspects were selected from a search through approximately 100 riddles for children.

Metalinguistic Awareness and Reading Achievement

The child who can reflect upon language may have developed special abilities that are prerequisite or contributory to developing literacy (Mattingly, 1979; Ryan, 1980). It is assumed that metalinguistic awareness is rather late in developing, and there appears to be considerable variation among individuals (Mattingly, 1979).

Holden and MacGinitie (1972) investigated children's perceptions of word boundaries in speech and print. Subjects were 84 kindergarten children. Children were to tap a poker chip for each spoken word. Analysis of the findings showed that children generally combined function words with the following content word. A second task required children to choose which card contained the same number of written words as a spoken sentence. No child consistently made a correct selection for a phrase or sentence that he/she did not segment orally. Only 5 of the 84 subjects could correctly match the printed form with correctly segmented oral sentences. It was concluded that children's perception of word boundaries often reflected response to rhythm and that they seemed to respond to utterances globally. Holden and MacGinitie hypothesized that beginning reading may be more difficult for individuals who cannot respond analytically or segment oral sentences.

Findings reported by Ehri (1975) supported the conclusions of Holden and MacGinitie (1972). In a sentence-segmentation task 9 children in preschool, 16 in kindergarten, and 10 in first grade moved poker chips for each word heard in a sentence. Prereaders had difficulty segmenting sentences and confused words and syllables. Readers achieved higher scores than nonreaders.

Children were asked to identify auditory stimuli as one word or not one word in the study by Johns (1979) discussed above. Results were presented as demonstrating that metalinguistic awareness of a spoken word increases with age and that a significant relationship exists with reading achievement.

In this study, however, later reading achievement was indicated by placement in a basal. Although age has been found to correlate with word segmentation (Papandropoulou & Sinclair, 1974), age was not partialled out in the studies by Johns or Holden and MacGinitie. The tasks used to measure children's concept of word may be unduly complex, as they typically require simultaneous tapping or moving of chips while repeating utterances (Lundberg, 1980).

Fowles and Glanz (1977) found level of competence with verbal riddles not to be clearly related to age, but there did appear to be some relationship to reading ability. Half of the 14 subjects were at or above grade level in reading, and half were achieving significantly below grade level as identified by their teachers. Better readers performed better on the riddle-comprehension task, particularly explaining why a riddle is funny or locating the source of ambiguity. A larger number of subjects might have provided different results.

Jewell (1978) found a gradual increase in scores on a Metalinguistic Awareness Battery administered in May to 124 children in kindergarten and again in October and December to 102 subjects in first grade. Wide variations were found, however, among children at each testing. Each subject was also tested with the Concept Assessment Kit--Conservation. The Gates-MacGinitie Reading Tests were used to measure reading achievement. Significant correlations beyond the .01 level were reported between all subtests of the Metalinguistic Awareness Battery administered in kindergarten and reading achievement. Conservation scores did not contribute significantly to prediction of reading achievement although correlations between the Metalinguistic Awareness Battery scores and Concept Assessment Kit scores were significant beyond the .01 level except between the Graphemic Awareness subtest and conservation.

Jewell reported that the findings suggested there may be an order of difficulty to aspects of metalinguistic awareness. There also appeared to be some factor tapped both by metalinguistic tasks and conservation tasks, a finding concurrent with previous research (Clark, 1978; de Villiers & de Villiers, 1972; Gleitman et al., 1972;

Slobin, 1978, 1980). This was proposed as a possible catalyst rather than a prerequisite to acquisition of reading ability.

As with most studies investigating the relationship between metalinguistic awareness and reading acquisition, some of the subtests of metalinguistic awareness presented visual stimuli which could be distracting. The Graphemic Awareness subtest required that subjects select letters from other symbols. The Phonemic Awareness subtest required children to attempt spelling of words presented orally by selecting the appropriate letter cards. It can be argued that these are not at all a measure of metalinguistic awareness, but rather a test of letter knowledge. Further research is needed that examines the relationship between ability to attend to oral-language properties and reading achievement.

Hirsh-Pasek, Gleitman, and Gleitman (1980) compared good and poor readers' ability to comprehend verbal jokes. Subjects were eight children in each of grades one through six. Good or poor reading ability was estimated by the school reading specialist. Children were asked to judge the funniness of jokes with ambiguity based on phonology, morphology, surface structure, deep structure, and morpheme boundary with and without phonological distortion. Explanation of why each joke was funny was also scored.

Performance was better for older children and superior readers than for younger children and poor readers. A significant main effect for grade ($p < .01$) and for reading ability ($p < .001$) and no interaction ($p < .05$) was found. Analysis of ambiguity effects indicated ambiguities of lexical interpretation and underlying structure easiest. More difficult were phonological and surface-structure ambiguities. Disruptions of unit boundaries posed particular problems, especially when compounded by phonological distortions. The order of difficulty found by Hirsh-Pasek et al. varied from the findings of Shultz and Pilon (1973), especially regarding sensitivity to phonological ambiguity. Their findings were in agreement, however, with those of Fowles and Glanz (1977)--that there are significant effects of talent in metalinguistic awareness that are independent of age.

Scholl and Ryan (1980) found some metalinguistic awareness of syntax to be associated with reading ability. Children's developing ability to judge grammaticality in relation to reading readiness and achievement was examined. Children in kindergarten, second, and fourth grades were presented with negatives and questions in correct order and two syntactically deviant forms. Repetition and judgment responses were elicited. Kindergarten children were assessed with a measure of reading readiness, while an oral-reading test was used to assess reading achievement of the older children.

Older children performed more successfully on the judgment task, but no age differences were reported for the repetition task. Readers demonstrated greater awareness and control of syntax on the judgment task than did prereaders.

The relationship between metalinguistic variables of word, syllabic, and phonemic segmentation and syntactic and semantic acceptability to reading achievement was investigated by Pfrimmer

(1980). Subjects were 32 first graders and 28 second graders. A metalinguistic awareness instrument was designed to test the aspects of ability to reflect on language. Reading was assessed with the Woodcock Reading Mastery Tests (Woodcock, 1973) and the Gilmore Oral Reading Test (Gilmore & Gilmore, 1968).

Pfrimmer reported that as much as 74% of the variance in reading was accounted for by metalinguistic awareness. Positive correlations between reading achievement and the metalinguistic variables were found. With age partialled out, these correlations were significant at the .01 or .001 level. As in some of the other studies discussed, age was not significantly correlated with metalinguistic awareness. Surprisingly, semantic awareness was found to produce the weakest relationship to reading. Pfrimmer, however, reported a ceiling effect on the Semantic Acceptability subtest. Additionally, the word, syllable, and phonemic tasks required subjects simultaneously to repeat and tap, posing the same possible problem noted in other word-segmentation studies.

A study by Bohannon, Warren-Leubecker, and Helper (1984) related children's awareness of word order to measures of reading readiness. In the first study, subjects were 102 first-grade children. They were presented a word-order discrimination task that required them to discriminate between orally presented, normal, and scrambled-word-order sentences. No significant age differences were found between aware and unaware children. Results did confirm the hypothesis that word-order discrimination was related to reading readiness. All four children considered advanced on measures of reading readiness and instructional grouping were aware of word order. Approximately three-quarters of the remedial group were unaware as measured by their performance on the word-order discrimination task. Of children in the average group, discriminators performed better on two of three measures of readiness.

The second, one-year longitudinal study related five, six, and seven year olds' ability on the word-order discrimination task to that on a test of general vocabulary (Peabody Picture Vocabulary Test). At the end of one year, subjects were tested on the Gates-MacGinitie tests of reading achievement. Results indicated that older children performed better on the word-order awareness task and that those making fewer errors were reading an average of one year and three months ahead of the unaware children, according to the Gates-MacGinitie Tests. Peabody Picture Vocabulary Test IQ scores did not significantly correlate with either subtest of the Gates-MacGinitie Tests. The authors argued that children who are aware of word-order cues have a decisive advantage when approaching the reading task.

It is clear that recent studies have provided only preliminary evidence of the relationship between metalinguistic-awareness variables and reading achievement. Several of these studies have indicated that metalinguistic awareness may be predictive of reading achievement. Few studies, however, have dealt solely with the relationship of metalinguistic awareness of oral language and reading achievement. Furthermore, areas of metalinguistic awareness related to reading remain unclear. The present study explored the relationship between two levels (repetition, representative of Mattingly's access; and explanation of more conscious control) and four aspects (phonological, lexical, surface, and deep structure) of metalinguistic awareness of spoken language and reading achievement in an effort to extend current research.

CHAPTER III

METHODOLOGY

Introduction

This study was undertaken to investigate the relationship between metalinguistic awareness and reading achievement in young children who were in the early stages of learning to read. Chapter III is arranged in six sections. The selection and characteristics of subjects are first described. Section two explains the instruments employed in the study to measure reading achievement and metalinguistic awareness, including descriptive statistics for the Riddle Test of Metalinguistics. Next, the research procedures are outlined. The hypotheses formulated for this study are presented in section four. The final section describes the treatment of data. A summary of the methodology concludes this chapter.

Subjects

All students in three self-contained classrooms in a suburban elementary school in Ottawa County, Michigan, participated in the study. The community is described as homogeneous, white, and middle class. Subjects were 33 first graders (15 boys, 18 girls) and 42 second graders (23 boys, 19 girls) all attending regular self-contained classrooms. All students were monolingual English-speaking students. Five first-grade students and 17 second-grade students comprised a split-grade classroom.

Chronological age of the first-grade students ranged from 6 years, 6 months to 7 years, 11 months with a mean of 7 years, 2 months. Second-grade subjects ranged in age from 7 years, 5 months to 9 years, 1 month with a mean of 8 years, 3 months. The total pool of subjects included 38 boys and 37 girls ranging in age from 6 years, 6 months to 9 years, 1 month with a mean chronological age of 7 years, 9 months. (See Table 1.)

Table 1.--Chronological age (in months) of participants.

Grade	Mean	Range
1	86.1	78-95
2	98.7	89-109

All teachers reported use of the same basal series as the primary instructional material for reading. Additionally, all three teachers used Workshop Way activities as supplementary. All children were grouped for reading instruction, with individual teachers reporting three or four reading groups. A reading teacher provided special prescriptive help to a few children from the classrooms.

Description of the Instruments

The purpose of this study was to investigate the relationship between metalinguistic awareness and reading achievement. Thus it was necessary to select instruments to assess metalinguistic awareness and reading achievement of the first- and second-grade participants of the study.

Test of Reading Achievement

Levels A and B, Form 1, of the Gates-MacGinitie Reading Tests (GMRT) (1978) were used as measures of reading achievement. Level A is intended for use in first grade, and Level B is intended for use in second grade. Both levels consist of two parts, vocabulary and comprehension. The GMRT was selected because of its high reliability, format, and appropriateness for use with children in May of first and second grades.

The vocabulary subtest of both levels consists of 45 items of increasing difficulty. This subtest samples the child's ability to select the one word from a group of four that most closely corresponds to the meaning of the accompanying illustration. The four words for each picture are similar in configuration and sound. The comprehension subtest contains 40 items at each level. This subtest is intended to measure the child's ability to understand "words and ideas within a passage" (Gates & MacGinitie, 1978, p. 2). Passages are of increasing length and complexity.

Measure of Metalinguistic Awareness (MLA)

The verbal riddle comprehension task and scoring procedure used by Fowles and Glanz (1977) were used to measure metalinguistic awareness. As Fowles and Glanz noted, "riddles have emerged as a good indicator of the child's tendency to focus on the surface properties of language" (p. 451). Shultz (1974) and Sutton-Smith (1976) indicated a shift in children's development of appreciation and comprehension of riddles between six and eight years of age. Furthermore, riddles provide a rather natural, familiar, and entirely oral language task to tap individuals' developing ability to focus on the structure of language.

Four riddles of each of four types were included in the riddle task (Appendix A). Riddles from the Fowles and Glanz study were used. In addition, the researcher selected four phonological riddles from an examination of approximately 100 riddles for children. A riddle was categorized as containing phonological ambiguity when a phonological sequence could be interpreted in more than one way. For example, Q. What day of the week is the best for cooking bacon? A. Friday (fry day).

The remaining riddles were selected from those used in the Fowles and Glanz study. Riddles containing lexical ambiguity include a lexical item that presents more than one possible semantic interpretation, as in Q. What has 18 legs and catches flies? A. A baseball team.

When words of a sentence can be grouped in more than one way, providing more than one possible interpretation, surface-structure ambiguity results. The riddle, Q. Why did the country boy go to the city? A. To see the barn dance, is an example.

The fourth type of riddle presented deep-structure ambiguity with two underlying meanings represented by a single surface structure. For example, Q. What kind of animal can jump higher than a house? A. Any animal. Houses can't jump.

Scoring procedures were also adopted from the Fowles and Glanz study. Two levels of awareness were measured. Ability to retell riddles and ability to explain them were scored separately on a three-point scale. Retelling of the riddles is similar to elicited imitation and assumed to represent what Mattingly (1979) referred to as "access" to the surface properties of riddles but does not require consciousness and verbalization about these properties. The ability to explain adequately why a riddle is funny, however, requires consciousness of the surface properties and identification of the linguistic source of the ambiguity.

A score of 1, 2, or 3 was assigned to each retelling and explanation. The scoring criteria were as follows.

Recall. Level 3: The subject was able to retell the riddle verbatim. Any changes were not relevant to comprehension or general format of the riddle. Fowles and Glanz explained that because of the moderate length of the riddle, a highly accurate repetition suggests an awareness of the role of surface properties of language in verbal riddles and in turn indicates some awareness of language itself as an object of attention. Accordingly, without minimal awareness of the riddle structure there is no framework for organizing the message, and retelling would be difficult because the child's rote memory is insufficient (p. 439).

Level 2: Retelling that adhered to some or all of the criteria for normal communication, but the structural properties of the riddle necessary for humor were not present. The question-answer format may have been collapsed or portions of either omitted. Focus of the retelling on content rather than form was indicated, and objectification of language was absent.

Level 1: Retelling was vague and confused. Most of the content was lost, and there was no evidence of familiarity with the riddle format.

Explanation. Level 3: Explanation of why a riddle was funny focused on the attributes of the language. The source of ambiguity was identified and clearly attributed to the language itself, while the situation to which the language referred was deemed irrelevant.

Level 2: An incongruity was identified, but its source was attributed to the situation rather than the language itself. The focus was on the communicative function of language rather than its form.

Level 1: A vague and confused explanation reflecting no awareness of the riddle format. The riddle seemed nonsensical or incomprehensible. No response was also scored at this level.

Descriptive Statistics for the Metalinguistic Riddle Comprehension Test

Means, standard deviations, and ranges were calculated for grades one and two as shown in Table 2. The scores for grade one revealed that mean scores for retelling of each riddle type ranged from 10.7 for retelling of lexical riddles to 9.4 for surface-structure riddles. Retell scores ranged from 7-12 and 6-12, respectively. Possible range for each type was 4-12, with 12 indicating good comprehension and 4 a lack of comprehension at this level according to the scoring criteria.

Table 2.--Means, standard deviations, and ranges for riddle comprehension tasks for first- and second-grade participants.

Riddle Task	First Graders[a]			Second Graders[b]		
	Mean	S.D.	Range	Mean	S.D.	Range
Total Riddle Retell	40.030	4.812	26-47	44.738	2.499	40-48
Total Riddle Explanation	24.667	4.587	17-35	28.476	4.576	17-40
Total Riddle Comprehension	64.697	8.114	43-81	73.286	5.857	61-88
Phonological Riddle Comprehension	16.939	2.703	10-22	19.452	2.132	16-24
Lexical Riddle Comprehension	17.273	2.388	11-21	19.214	1.616	16-22
Surface-Structure Riddle Comprehension	15.333	2.300	10-19	17.738	1.951	12-22
Deep-Structure Riddle Comprehension	15.091	2.006	11-21	17.238	2.293	12-23

[a]Based on 33 subjects.

[b]Based on 42 subjects.

Although scores ranged as low as 6, nearing the possible low of 4, as a group first-grade subjects approximated the high end of the possible scoring range indicating competence as measured by retell subtests.

As expected, first graders had more difficulty with the explanation subtests. Means for explanation subtests were: PE = 6.5, LE = 6.5, SE = 5.9, and DE = 5.5. First graders' mean scores were somewhat below the midpoint of the possible scoring range.

The mean for Total Retell scores was 40, above the midpoint of 32, while the mean for Total Explanation scores of 24 was well below the midpoint of the possible scoring range. Total Riddle Comprehension mean for first-grade subjects was 64.5, with a standard deviation of 8. For first-grade subjects, the explanation subtests discriminated between students better than did the retell subtests, where a possible ceiling effect was observed.

Scores for second-grade subjects indicated that the retell subtests were easier for this group as means for PR and LR subtests approximated the possible high of 12. Means for SR and DR were slightly lower at 10.6 but were well above the midpoint of 8. Total Retell mean, at 44.7, approached the maximum possible. Means for explanation scores fell approximately midway, with a mean of over 7 for both PE and LE and a mean of 7 for SE and 6.6 for DE. The mean TE score of 28.5 was slightly below the midpoint.

Both first- and second-grade subjects had little difficulty with the retell subtests, particularly PR and LR subtests, and greater difficulty with explanation subtests, in particular subtests SE and DE. A possible ceiling effect for retell subtests was observed for both first and second graders.

Intercorrelations of MLA Scores

To determine the extent of the relationships of the MLA subtests to each other, intercorrelations shown in Tables 3 and 4 were calculated. Intercorrelations of the MLA Total Recall and Total Explanation subtests were $r = .49$ ($p < .01$) for first-grade students and $r = .25$ for second-grade students, suggesting that while the coefficient for first-grade subjects was significant, the subtests were not redundant.

Table 3.--Intercorrelations between riddle comprehension variables for first-grade participants.

	TRE	TRC
Total Riddle Recall (TRR)	.490*	.870**
Total Riddle Explanation (TRE)	--	.856**
Total Riddle Comprehension (TRC)	--	--

*p < .01.

**p < .001.

Table 4.--Intercorrelations between riddle comprehension variables for second-grade participants.

	TRE	TRC
Total Riddle Recall (TRR)	.239	.626*
Total Riddle Explanation (TRE)	--	.888*
Total Riddle Comprehension (TRC)	--	--

*p < .001.

Design and Procedure

The riddle comprehension task and the Gates-MacGinitie Reading Tests were administered to all first- and second-grade students in three classrooms. The classroom teachers, trained by the researcher, administered the reading tests in their classrooms. The vocabulary and comprehension subtests were administered on separate days. Tests were scored by the investigator, and results were checked by the teachers for any noticeable discrepancy from observed classroom performance. No subjects were dropped from the study on this basis. Vocabulary, Comprehension, and Total Reading scores were obtained for each subject.

The researcher administered the riddle comprehension task individually to subjects. An average of three days was spent in each classroom to become familiar with students before administration of the riddles. Children were taken generally in alphabetical order unless it was disruptive to the normal operation of the classroom. The task was completed in a small, quiet room down the hall from the classrooms. All 16 riddles were presented in random order to each subject. Responses were tape recorded and transcribed for analysis and scoring. The children had used tape recorders in their classrooms regularly and seemed quite unaffected by this procedure. A score was obtained for each subject for both retell and explanation of each riddle.

Data Analysis

Fifteen bits of data were collected for each of 75 subjects. They were age in months, Gates-MacGinitie Reading Tests Vocabulary percentile score, Gates-MacGinitie Reading Tests Comprehension percentile score, Gates-MacGinitie Reading Tests Total percentile score, Total Riddle Recall score, Total Riddle Explanation score, Phonological Riddle Retell score, Phonological Riddle Explanation score, Lexical Riddle Retell score, Lexical Riddle Explanation score, Surface-Structure Riddle Retell score, Surface-Structure Riddle Explanation score, Deep-Structure Riddle Recall score, Deep-Structure Riddle Explanation score, and Total Riddle Comprehension score. (Appendix B lists data collected for each subject by number.)

Data were analyzed using the Statistical Package for the Social Sciences (SPSS), Version 8 (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). Pearson correlations were calculated for Null Hypotheses 1 and 2. Partial correlations and partial coefficients were calculated to determine the relationship of the metalinguistic factors and reaching achievement when adjusted for age. The results of these analyses were used to address Null Hypotheses 3 through 8.

Null Hypotheses

Ho 1.0: There will be no relationship between Riddle Comprehension Test scores and age for first-grade subjects.

Ho 1.1: There will be no relationship between Total Riddle Recall scores and age for first-grade subjects.

Ho 1.2: There will be no relationship between Total Riddle Explanation scores and age for first-grade subjects.

Ho 1.3: There will be no relationship between Total Riddle Comprehension scores and age for first-grade subjects.

Ho 2.0: There will be no relationship between Riddle Comprehension Test scores and age for second-grade subjects.

Ho 2.1: There will be no relationship between Total Riddle Recall scores and age for second-grade subjects.

Ho 2.2: There will be no relationship between Total Riddle Explanation scores and age for second-grade subjects.

Ho 2.3: There will be no relationship between Total Riddle Comprehension scores and age for second-grade subjects.

Ho 3.0: There will be no relationship between Riddle Comprehension Test scores and Gates-MacGinitie Reading Tests Vocabulary scores for first- and second-grade subjects.

Ho 3.1: There will be no relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects.

Ho 3.2: There will be no relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects.

Ho 3.3: There will be no relationship between Total Riddle Explanation scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects.

Ho 3.4: There will be no relationship between Total Riddle Explanation scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects.

Ho 3.5: There will be no relationship between Total Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects.

Ho 3.6: There will be no relationship between Total Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects.

Ho 4.0: There will be no relationship between Riddle Comprehension Test scores and Gates-MacGinitie Reading Tests Comprehension scores for first- and second-grade subjects.

Ho 4.1: There will be no relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects.

Ho 4.2: There will be no relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects.

Ho 4.3: There will be no relationship between Total Riddle Explanation scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects.

Ho 4.4: There will be no relationship between Total Riddle Explanation scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects.

Ho 4.5: There will be no relationship between Total Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects.

Ho 4.6: There will be no relationship between Total Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects.

Ho 5.0: There will be no relationship between Riddle Comprehension Test scores and Gates-MacGinitie Reading Tests Total scores for first- and second-grade subjects.

Ho 5.1: There will be no relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects.

Ho 5.2: There will be no relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects.

Ho 5.3: There will be no relationship between Total Riddle Explanation scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects.

Ho 5.4: There will be no relationship between Total Riddle Explanation scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects.

Ho 5.5: There will be no relationship between Total Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects.

Ho 5.6: There will be no relationship between Total Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects.

Ho 6.0: There will be no relationship between Phonological, Lexical, Surface Structure, and Deep Structure subtest scores and Gates-MacGinitie Reading Tests Vocabulary scores for first- and second-grade subjects.

Ho 6.1: There will be no relationship between Phonological Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects.

Ho 6.2: There will be no relationship between Phonological Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects.

Ho 6.3: There will be no relationship between Lexical Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects.

Ho 6.4: There will be no relationship between Lexical Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects.

Ho 6.5: There will be no relationship between Surface Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects.

Ho 6.6: There will be no relationship between Surface Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects.

Ho 6.7: There will be no relationship between Deep Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects.

Ho 6.8: There will be no relationship between Deep Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects.

Ho 7.0: There will be no relationship between Phonological, Lexical, Surface Structure, and Deep Structure subtest scores and Gates-MacGinitie Reading Tests Comprehension scores for first- and second-grade subjects.

Ho 7.1: There will be no relationship between Phonological Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects.

Ho 7.2: There will be no relationship between Phonological Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects.

Ho 7.3: There will be no relationship between Lexical Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects.

Ho 7.4: There will be no relationship between Lexical Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects.

Ho 7.5: There will be no relationship between Surface Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects.

Ho 7.6: There will be no relationship between Surface Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects.

Ho 7.7: There will be no relationship between Deep Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects.

Ho 7.8: There will be no relationship between Deep Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects.

Ho 8.0: There will be no relationship between Phonological, Lexical, Surface Structure, and Deep Structure subtest scores and Gates-MacGinitie Reading Tests Total scores for first- and second-grade subjects.

Ho 8.1: There will be no relationship between Phonological Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects.

Ho 8.2: There will be no relationship between Phonological Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects.

Ho 8.3: There will be no relationship between Lexical Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects.

Ho 8.4: There will be no relationship between Lexical Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects.

Ho 8.5: There will be no relationship between Surface Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects.

Ho 8.6: There will be no relationship between Surface Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects.

Ho 8.7: There will be no relationship between Deep Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects.

Ho 8.8: There will be no relationship between Deep Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects.

Summary

The procedures and methodology used to complete the study were described in this chapter. The sample consisted of 33 first-grade students and 42 second-grade students attending one elementary school in western Michigan. A description of the instruments used in the study was presented.

The investigator explored the relationship between various variables of metalinguistic awareness and reading achievement. Age was partialed out of the correlations of riddle comprehension and reading achievement.

Research procedures were outlined and treatment of data delineated. The null hypotheses were presented. Chapter IV contains the hypotheses along with related statistical findings.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

Introduction

The purpose of this chapter is to present the results of the analysis of data. Hypotheses centered on four areas: (a) the relationship between age and metalinguistic awareness, (b) the relationship between riddle recall and reading achievement, (c) the relationship between riddle explanation and reading achievement, and (d) the relationship of riddle comprehension by each riddle type to reading achievement. Data acquired and results are presented by hypothesis.

Four types and two levels of riddle comprehension information were described and entered into the study as metalinguistic variables: phonological, lexical, surface-structure, and deep-structure-ambiguity riddles, and retell and explanation of each of these four riddle types. Standardized reading achievement data were collected. Methods of data collection were described in Chapter III, as were null hypotheses and statistical analysis methods.

An attempt was made to examine the data with multiple regression analysis. No significance was attained by the main factors. Therefore, the relationship between metalinguistic awareness and reading achievement was analyzed by computing Pearson product-moment correlation coefficients and partial correlations for scores on the riddle comprehension task and GMRT scores, using the SPSS statistical package, version 8 (Nie et al., 1975). A probability level of .05 or less was established for correlations to be considered significant.

Hypotheses and Statistical Tests

Ho 1.1: There will be no relationship between Total Riddle Recall scores and age for first-grade subjects.

Table 5 reports the Pearson correlations relating measures of Riddle Comprehension and age for first- and second-grade subjects. The Pearson correlation relating Total Riddle Recall scores and age was $r = .12$, based on 33 subjects. The null hypothesis was not rejected. There was no statistically significant relationship between Total Riddle Recall and age for first-grade subjects.

Table 5.--Correlations between Riddle Comprehension and age for first- and second-grade subjects.

	First Graders	Second Graders
Riddle Recall	.116	.282
Riddle Explanation	.104	.238
Total Riddle Comprehension	.128	.312*

*$p < .05$.

Ho 1.2: There will be no relationship between Total Riddle Explanation scores and age for first-grade subjects.

The Pearson correlation relating Total Explanation scores and age was r = .10, based on 33 subjects. This correlation was not statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Total Riddle Explanation scores and age for first-grade subjects.

Ho 1.3: There will be no relationship between Total Riddle Comprehension scores and age for first-grade subjects.

The Pearson correlation relating Total Riddle Comprehension scores and age was r = .13, based on 33 subjects. This correlation was not statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Total Riddle Comprehension and age for first-grade subjects.

Ho 2.1: There will be no relationship between Total Riddle Recall scores and age for second-grade subjects.

The Pearson correlation relating Total Riddle Recall scores and age was r = .282, based on 42 subjects. This correlation was not statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Total Riddle Recall scores and age for second-grade subjects.

Ho 2.2: There will be no relationship between Total Riddle Explanation scores and age for second-grade subjects.

The Pearson correlation relating Total Riddle Explanation scores and age was r = .238, based on 42 subjects. The null hypothesis was not rejected. There was no statistically significant relationship between Total Riddle Explanation scores and age for second-grade subjects.

Ho 2.3: There will be no relationship between Total Riddle Comprehension scores and age for second-grade subjects.

The Pearson correlation relating Total Riddle Comprehension scores and age was r = .312, based on 42 subjects. The null hypothesis was rejected. There was a statistically significant relationship between Total Riddle Comprehension and age for second-grade subjects. The older the subjects in this sample, the higher they tended to score on the measure of Total Riddle Comprehension.

Ho 3.1: There will be no relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects.

Tables 6 and 7 report the Pearson and partial correlations between Riddle Comprehension tasks and Gates-MacGinitie Reading Tests (GMRT) scores for first- and second-grade subjects, respectively.

The correlation between Total Riddle Recall scores and GMRT Vocabulary was r = .53, based on 33 subjects. The partial correlation controlled for age was r = .51, $p < .01$. The null hypothesis was rejected. There was a statistically significant relationship between Total Riddle Recall scores and GMRT Vocabulary scores for first-grade subjects. Partialing out age had the effect of reducing the correlation between measures of riddle recall and reading achievement in this sample. First-grade subjects who scored higher on Total Riddle Recall tended to score higher on the GMRT Vocabulary subtest.

Ho 3.2: There will be no relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects.

The correlation relating Total Riddle Recall scores and GMRT Vocabulary scores for second-grade subjects was r = .31, based on 42

Table 6.--Pearson correlations and partial correlations controlling for age between GMRT scores and Riddle Comprehension tasks for first-grade subjects.

Riddle Task	Gates-MacGinitie Reading Tests					
	Vocabulary		Comprehension		Total	
	r	Partial r	r	Partial r	r	Partial r
Total Riddle Recall	.528***	.509**	.269	.252	.457**	.436**
Total Riddle Explanation	.314	.292	.006	.011	.228	.204
Total Riddle Comprehension	.491**	.467**	.163	.143	.399*	.374*
Phonological Riddle Comprehension	.431**	.369*	.201	.157	.397*	.338*
Lexical Riddle Comprehension	.369*	.349*	.098	.081	.277	.255
Surface Structure Riddle Comprehension	.441**	.408*	.142	.116	.344*	.310*
Deep Structure Riddle	.470**	.520**	.154	.177	.381*	.425**

Note: Based on 33 subjects.

*p < .05.

**p < .01.

***p < .001.

Table 7.--Pearson correlations and partial correlations controlling for age between GMRT scores and Riddle Comprehension tasks for second-grade subjects.

Riddle Task	Gates-MacGinitie Reading Tests					
	Vocabulary		Comprehension		Total	
	r	Partial r	r	Partial r	r	Partial r
Total Riddle Recall	.305*	.277	.253	.229	.332*	.301*
Total Riddle Explanation	.125	.094	.065	.038	.143	.109
Total Riddle Comprehension	.230	.196	.160	.130	.257	.220
Phonological Riddle Comprehension	.297*	.262	.295*	.272	.365*	.332*
Lexical Riddle Comprehension	.182	.136	.046	.003	.143	.086
Surface Structure Riddle Comprehension	.290*	.264	.074	.045	.258	.227
Deep Structure Riddle	.107	.101	.201	.197	.217	.212

Note: Based on 42 subjects.

*p < .05.

subjects. The partial correlation controlled for age was $r = .28$, $p = .07$. Only the first of these two correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship; when the Total Riddle Recall/GMRT Vocabulary relationship was controlled for age, the formerly significant relationship became nonsignificant. Age had an effect on the statistically significant relationship between Total Riddle Recall and GMRT Vocabulary scores for second-grade subjects.

Ho 3.3: There will be no relationship between Total Riddle Explanation scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects.

The Pearson correlation relating Total Riddle Explanation scores and GMRT Vocabulary scores was $r = .31$ based on 33 subjects. The partial correlation controlled for age was .29 for second-grade subjects. The correlations were of approximately the same magnitude. Neither of these correlations was significant. The null hypothesis was not rejected. There was no statistically significant relationship between Total Riddle Explanation and GMRT Vocabulary scores for first-grade subjects.

Ho 3.4: There will be no relationship between Total Riddle Explanation scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects.

The Pearson correlation relating Total Riddle Explanation scores and GMRT Vocabulary scores for second-grade subjects was $r = .13$, based on 42 subjects. The partial correlation controlled for age was .09. Neither of these correlations was significant. The null hypothesis was not rejected. There was no statistically significant relationship between Total Riddle Explanation and GMRT Vocabulary scores for second-grade subjects.

> Ho 3.5: There will be no relationship between Total Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects.

The Pearson correlation relating Total Riddle Comprehension and GMRT Vocabulary scores for first-grade subjects was $r = .49$, based on 33 subjects. The partial correlation controlled for age was .47, $p < .005$. The null hypothesis was rejected. There was a statistically significant relationship between Total Riddle Comprehension and GMRT Vocabulary scores for first-grade subjects. Age had no significant effect on this relationship in this sample. First-grade subjects who scored higher on the Total Riddle Comprehension test scored higher on the Vocabulary subtest of the GMRT.

> Ho 3.6: There will be no relationship between Total Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects.

The Pearson correlation relating Total Riddle Comprehension scores and GMRT Vocabulary scores for second-grade subjects was $r = .23$, based on 42 subjects. The partial correlation controlled for age was .20. These correlations were of approximately the same magnitude. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Total Riddle Comprehension and GMRT Vocabulary scores for second-grade subjects.

> Ho 4.1: There will be no relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects.

The Pearson correlation relating Total Riddle Recall scores and GMRT Comprehension scores was r = .27, based on 33 subjects. The partial correlation controlled for age was .25. These correlations were of approximately the same magnitude. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Total Riddle Recall scores and GMRT Comprehension scores for first-grade subjects.

Ho 4.2: There will be no relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects.

The Pearson correlation relating Total Riddle Recall and GMRT Comprehension scores for second-grade subjects was r = .25, based on 42 subjects. The partial correlation controlled for age was .23. These correlations were of approximately the same magnitude. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Total Riddle Recall scores and GMRT Comprehension scores for second-grade subjects.

Ho 4.3: There will be no relationship between Total Riddle Explanation scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects.

The Pearson correlation relating Total Riddle Explanation scores and GMRT Comprehension scores for first-grade subjects was r = .01, based on 33 subjects. The partial correlation controlled for age was .01. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Total Riddle Explanation scores and GMRT Comprehension scores for second-grade subjects.

> Ho 4.4: There will be no relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects.

The Pearson correlation relating Total Riddle Explanation scores and GMRT Comprehension scores was r = .07, based on 42 subjects. The partial correlation controlled for age was .04. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Total Riddle Explanation and GMRT Comprehension scores for second-grade subjects.

> Ho 4.5: There will be no relationship between Total Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects.

The Pearson correlation relating Total Riddle Comprehension scores and GMRT Comprehension scores was r = .16, based on 33 subjects. The partial correlation controlled for age was .14. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Total Riddle Comprehension and GMRT Comprehension scores for first-grade subjects.

> Ho 4.6: There will be no relationship between Total Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects.

The Pearson correlation relating Total Riddle Comprehension scores and GMRT Comprehension scores was r = .16, based on 42 subjects. The partial correlation controlled for age was .13. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Total Riddle Comprehension and GMRT Comprehension scores for second-grade subjects.

Ho 5.1: There will be no relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects.

The Pearson correlation relating Total Riddle Recall scores and GMRT Total scores was $r = .46$, based on 33 subjects. The partial correlation controlled for age was .44, $p < .01$. The null hypothesis was rejected. There was a statistically significant relationship between Total Riddle Recall and GMRT Total scores for first-grade subjects. Partialing out age had no significant effect on the Riddle Recall/reading achievement relationship in this sample. First-grade subjects who scored higher on Total Riddle Recall tended to score higher on the GMRT Total score.

Ho 5.2: There will be no relationship between Total Riddle Recall scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects.

The Pearson correlation relating Total Riddle Recall scores and GMRT Total scores was $r = .33$, based on 42 subjects. The partial correlation controlled for age was .30, $p < .05$. The null hypothesis was rejected. There was a statistically significant relationship between Total Riddle Recall and GMRT Total scores for second-grade subjects. Age had no significant effect on the Riddle Recall/reading achievement relationship in this sample. Second-grade students who scored higher on the Riddle Recall measure scored higher on the measure of reading achievement.

Ho 5.3: There will be no relationship between Total Riddle Explanation scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects.

The Pearson correlation relating Total Riddle Explanation and GMRT Total scores was $r = .23$, based on 33 subjects. The partial correlation controlled for age was .20. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Total Riddle Explanation scores and GMRT Total scores for first-grade subjects.

Ho 5.4: There will be no relationship between Total Riddle Explanation scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects.

The Pearson correlation relating Total Riddle Explanation scores and GMRT Total scores was $r = .14$, based on 42 subjects. The partial correlation controlled for age was .11. These correlations were of approximately the same magnitude. Neither correlation was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Total Riddle Explanation scores and GMRT Total scores for second-grade subjects.

Ho 5.5: There will be no relationship between Total Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects.

The Pearson correlation relating Total Riddle Comprehension scores and GMRT Total scores was $r = .40$, based on 33 subjects. The partial correlation controlled for age was .37, $p < .05$. The null hypothesis was rejected. There was a statistically significant relationship between Total Riddle Comprehension scores and GMRT Total scores for first-grade subjects. First-grade subjects who scored higher on Total Riddle Comprehension scored higher on the Reading Comprehension subtest of the GMRT.

> Ho 5.6: There will be no relationship between Total Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects.

The Pearson correlation relating Total Riddle Comprehension scores and GMRT Total scores was $r = .26$, based on 42 subjects. The partial correlation controlled for age was .22. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Total Riddle Comprehension scores and GMRT Total scores for second-grade subjects.

> Ho 6.1: There will be no relationship between Phonological Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects.

The Pearson correlation relating Phonological Riddle Comprehension scores and GMRT Vocabulary scores was $r = .43$, based on 33 subjects. The partial correlation controlled for age was .37, $p < .05$. The null hypothesis was rejected. There was a statistically significant relationship between Phonological Riddle Comprehension scores and GMRT Vocabulary scores for first-grade subjects. Partialing out age had the effect of reducing the correlation between measures of Phonological Riddle Comprehension and reading achievement in this sample. First-grade subjects who scored higher on the Phonological Riddle Comprehension measure tended to score higher on the GMRT Vocabulary subtest.

Ho 6.2: There will be no relationship between Phonological Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects.

The Pearson correlation relating Phonological Riddle Comprehension and GMRT Vocabulary scores was $r = .30$, $p < .05$, based on 42 subjects. The partial correlation controlled for age was .26. Only the first of these correlations was statistically significant. The null hypothesis was not rejected. The Phonological Riddle Comprehension/reading achievement relationship was significant for second-grade students. However, partialing out age had the effect of reducing the positive and statistically significant relationship between Phonological Riddle Comprehension and GMRT Vocabulary scores to a positive but nonsignificant relationship for second-grade subjects.

Ho 6.3: There will be no relationship between Lexical Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects.

The Pearson correlation relating Lexical Riddle Comprehension scores and GMRT Vocabulary scores was $r = .37$, based on 33 subjects. The partial correlation controlled for age was .35, $p < .05$. The null hypothesis was rejected. There was a statistically significant relationship between Lexical Riddle Comprehension scores and GMRT Vocabulary scores for first-grade subjects. Partialing out age had no significant effect on the Lexical Riddle Comprehension/reading vocabulary correlation in this sample. First-grade subjects who scored higher on the test of Lexical Riddle Comprehension tended to score higher on the Vocabulary subtest of the GMRT.

Ho 6.4: There will be no relationship between Lexical Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects.

The Pearson correlation relating Lexical Riddle Comprehension and GMRT Vocabulary scores was $r = .18$, based on 42 subjects. The partial correlation controlled for age was .14. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Lexical Riddle Comprehension scores and GMRT Vocabulary scores for second-grade subjects.

Ho 6.5: There will be no relationship between Surface Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects.

The Pearson correlation relating Surface Structure Riddle Comprehension scores and GMRT Vocabulary scores was $r = .44$, based on 33 subjects. The partial correlation controlled for age was .41, $p < .01$. The null hypothesis was rejected. There was a positive statistically significant relationship between Surface Structure Riddle Comprehension and GMRT Vocabulary scores. Partialing out age had no statistically significant effect on the relationship. First graders who scored higher on the measure of Surface Structure Riddle Comprehension scored higher on the Vocabulary subtest of the GMRT.

Ho 6.6: There will be no relationship between Surface Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects.

The Pearson correlation relating Surface Structure Riddle Comprehension scores and GMRT Vocabulary scores was $r = .29$, $p < .05$, based on 42 subjects. The partial correlation controlled for age was r = .26. The partial correlation was not statistically significant. The null hypothesis was not rejected. There was a low and positive relationship between Surface Structure Riddle Comprehension and GMRT Vocabulary scores for second-grade subjects. Although the correlation controlled for age approached significance, partialing out age reduced the statistically significant correlation relating Surface Structure Riddle Comprehension and GMRT Vocabulary to a statistically nonsignificant correlation.

> Ho 6.7: There will be no relationship between Deep Structure Riddle Comprehension and Gates-MacGinitie Reading Tests Vocabulary scores for first-grade subjects.

The Pearson correlation relating Deep Structure Riddle Comprehension and GMRT Vocabulary scores was r = .47, based on 33 subjects. The partial correlation controlled for age was .52, p < .01. The null hypothesis was rejected. There was a statistically significant relationship between Deep Structure Riddle Comprehension scores and GMRT Vocabulary scores for first-grade subjects. First-grade subjects who scored higher on the measure of Deep Structure Riddle Comprehension scored higher on the reading vocabulary subtest. It was interesting that partialing out age increased the Deep Structure Riddle Comprehension/reading vocabulary relationship in this sample.

> Ho 6.8: There will be no relationship between Deep Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Vocabulary scores for second-grade subjects.

The Pearson correlation relating Deep Structure Riddle Comprehension scores and GMRT Vocabulary scores was r = .12, based on

42 subjects. The partial correlation controlled for age was .10. These correlations were of approximately the same magnitude. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Deep Structure Riddle Comprehension scores and GMRT Vocabulary scores for second-grade subjects.

Ho 7.1: There will be no relationship between Phonological Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects.

The Pearson correlation relating Phonological Riddle Comprehension and GMRT Comprehension scores was $r = .20$, based on 33 subjects. The partial correlation controlled for age was .16. These correlations were of approximately the same magnitude. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Phonological Riddle Comprehension scores and GMRT Comprehension scores for first-grade subjects.

Ho 7.2: There will be no relationship between Phonological Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects.

The Pearson correlation relating Phonological Riddle Comprehension scores and GMRT Comprehension scores was $r = .30$, $p < .05$, based on 42 subjects. The partial correlation controlled for age was .27. Although these two correlations were of approximately the same magnitude, only the first was statistically significant. The null hypothesis was not rejected. There was a statistically significant relationship between Phonological Riddle Comprehension scores and GMRT Comprehension scores for second-grade subjects. When the Phonological Riddle Comprehension/reading comprehension relationship was controlled for age, the formerly significant relationship became nonsignificant.

Ho 7.3: There will be no relationship between Lexical Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects.

The Pearson correlation relating Lexical Riddle Comprehension scores and GMRT Comprehension scores was $r = .10$, based on 33 subjects. The partial correlation controlled for age was .08. These correlations were of approximately the same magnitude. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Lexical Riddle Comprehension scores and GMRT Comprehension scores for first-grade subjects.

Ho 7.4: There will be no relationship between Lexical Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects.

The Pearson correlation relating Lexical Riddle Comprehension scores and GMRT Comprehension scores was $r = .05$, based on 42 subjects. The partial correlation controlled for age was .003. These correlations were of approximately the same magnitude. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Lexical Riddle Comprehension scores and GMRT Comprehension scores for second-grade subjects.

Ho 7.5: There will be no relationship between Surface Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects.

The Pearson correlation relating Surface Structure Riddle Comprehension scores and GMRT Comprehension scores was r = .14, based on 33 subjects. The partial correlation controlled for age was .12. These correlations were of approximately the same magnitude. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Surface Structure Riddle Comprehension scores and GMRT Comprehension scores for first-grade subjects.

Ho 7.6: There will be no relationship between Surface Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects.

The Pearson correlation relating Surface Structure Riddle Comprehension scores and GMRT Comprehension scores was r = .07, based on 42 subjects. The partial correlation controlled for age was .05. These correlations were of approximately the same magnitude. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Surface Structure Riddle Comprehension scores and GMRT Comprehension scores for second-grade subjects.

Ho 7.7: There will be no relationship between Deep Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for first-grade subjects.

The Pearson correlation relating Deep Structure Riddle Comprehension scores and GMRT Comprehension scores was r = .15, based on 33 subjects. The partial correlation controlled for age was .18. These correlations were of approximately the same magnitude. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Deep Structure Riddle Comprehension scores and GMRT Comprehension scores for first-grade subjects.

Ho 7.8: There will be no relationship between Deep Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Comprehension scores for second-grade subjects.

The Pearson correlation relating Deep Structure Riddle Comprehension scores and GMRT Comprehension scores was $r = .20$, based on 42 subjects. The partial correlation controlled for age was .20. These correlations were not statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Deep Structure Riddle Comprehension scores and GMRT Comprehension scores for second-grade subjects.

Ho 8.1: There will be no relationship between Phonological Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects.

The Pearson correlation relating Phonological Riddle Comprehension scores and GMRT Total scores was $r = .40$, $p < .05$, based on 33 subjects. The partial correlation controlled for age was .34, $p < .05$. The null hypothesis was rejected. There was a statistically significant relationship between Phonological Riddle Comprehension scores and GMRT Total scores for first-grade subjects. Partialing out age had no significant effect on the Phonological Riddle Comprehension/reading achievement correlation in this sample.

First-grade subjects who scored higher on the test of Phonological Riddle Comprehension had higher Total scores on the GMRT.

> Ho 8.2: There will be no relationship between Phonological Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects.

The Pearson correlation relating Phonological Riddle Comprehension and GMRT Total scores was $r = .37$, based on 42 subjects. The partial correlation controlled for age was .33, $p < .05$. The null hypothesis was rejected. There was a statistically significant relationship between Phonological Riddle Comprehension scores and GMRT Total scores for second-grade subjects. Partialing out age had the effect of reducing the Phonological Riddle Comprehension/reading achievement relationship. Second-grade subjects who scored higher on the measure of Phonological Riddle Comprehension had higher Total scores on the GMRT.

> Ho 8.3: There will be no relationship between Lexical Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects.

The Pearson correlation relating Lexical Riddle Comprehension scores and GMRT Total scores was $r = .28$, based on 33 subjects. The partial correlation controlled for age was .26. These correlations were of approximately the same magnitude. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Lexical Riddle Comprehension scores and GMRT Total scores for first-grade subjects.

Ho 8.4: There will be no relationship between Lexical Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects.

The Pearson correlation relating Lexical Riddle Comprehension scores and GMRT Total scores was $r = .14$, based on 42 subjects. The partial correlation controlled for age was .09. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Lexical Riddle Comprehension scores and GMRT Total scores for second-grade subjects.

Ho 8.5: There will be no relationship between Surface Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects.

The Pearson correlation relating Surface Structure Riddle Comprehension scores and GMRT Total scores was $r = .34$, $p < .05$, based on 33 subjects. The partial correlation controlled for age was .31, $p < .05$. The null hypothesis was rejected. There was a statistically significant relationship between Surface Structure Riddle Comprehension scores and GMRT Total scores for first-grade subjects. Partialing out age had no significant effect on the Surface Structure Riddle Comprehension/reading achievement correlation in this sample. First graders who scored higher on the measure of Surface Structure Riddle Comprehension had higher Total scores on the GMRT.

Ho 8.6: There will be no relationship between Surface Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects.

The Pearson correlation relating Surface Structure Riddle Comprehension scores and GMRT Total scores was r = .26, based on 42 subjects. The partial correlation controlling for age was .23. These correlations were of approximately the same magnitude. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Surface Structure Riddle Comprehension scores and GMRT Total scores for second-grade subjects.

Ho 8.7: There will be no relationship between Deep Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for first-grade subjects.

The Pearson correlation relating Deep Structure Riddle Comprehension scores and GMRT Total scores was r = .38, p < .05, based on 33 subjects. The partial correlation controlled for age was .43, p < .01. The null hypothesis was rejected. There was a statistically significant relationship between Deep Structure Riddle Comprehension scores and GMRT Total scores for first-grade subjects. It is interesting that partialing out age had the effect of increasing the significance of the correlation between measures of Deep Structure Riddle Comprehension and reading achievement in this sample. First-grade subjects who scored higher on the measure of Deep Structure Riddle Comprehension had higher Total scores on the GMRT.

Ho 8.8: There will be no relationship between Deep Structure Riddle Comprehension scores and Gates-MacGinitie Reading Tests Total scores for second-grade subjects.

The Pearson correlation relating Deep Structure Riddle Comprehension scores and GMRT Total scores was r = .22, based on 42 subjects. The partial correlation controlled for age was .21. These correlations were of approximately the same magnitude. Neither of these correlations was statistically significant. The null hypothesis was not rejected. There was no statistically significant relationship between Deep Structure Riddle Comprehension scores and GMRT Total scores for second-grade subjects.

Summary

The null hypotheses presented in Chapter III were tested in Chapter IV. Significant correlations between metalinguistic awareness and reading achievement were found. The following null hypotheses were rejected: 2.3, 3.1, 3.5, 5.1, 5.2, 5.5, 6.1, 6.3, 6.5, 6.7, 8.1, 8.2, 8.5, and 8.7.

In Chapter V, the results of the study are discussed. These results are interpreted in the context of related literature and theory.

CHAPTER V

SUMMARY, DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to explore the relationship between metalinguistic awareness and reading achievement in young students in the early stages of reading. The issue has been clouded by limited data and varying results.

The subjects consisted of 75 first- and second-grade students from a suburban elementary school. The Gates-MacGinitie Reading Tests (GMRT) and a riddle comprehension task were given to all subjects.

The relationship of metalinguistic awareness as measured by riddle comprehension to reading achievement was explored. Previous research has indicated a relationship between age and metalinguistic awareness. The relationship of age was correlated to Riddle Recall, Explanation, and Total Riddle Comprehension performance data. Then partial correlations controlling for age were applied to the data to test the relationship between level and type-of-riddle comprehension to reading achievement scores.

This chapter summarizes the methodology and results of the study. Conclusions based on the results of the study are stated, and implications for theory, instruction, and research are drawn.

Discussion

> Research Question 1: Will there be a relationship between Riddle Comprehension Test scores and age for first-grade subjects?

A developmental relationship between aspects of metalinguistic awareness and age has been found by some researchers (Shultz & Pilon, 1973; Shultz, 1974; Shultz & Horibe, 1974; Sutton-Smith, 1976). For this reason, it was expected that Riddle Comprehension and age correlations would be of some significantly positive magnitude. This did not prove to be the case with first-grade students. Riddle Recall, Explanation, and Total Comprehension scores showed a very low positive relationship that was not significant.

> Research Question 2: Will there be a relationship between Riddle Comprehension Test scores and age for second-grade subjects?

The riddle comprehension/age correlations proved to be stronger with second-grade subjects. The riddle recall/age relationship was positive and approached significance ($r = .282$, $p = .0634$). The Riddle Explanation/age relationship was lower and not significant, while the combined Total Riddle Comprehension scores showed a low statistically significant relationship to age ($r = .312$, $p < .05$).

Although low, the stronger riddle comprehension/age relationship found for second-grade subjects is supportive of the theory of developmental acquisition of metalinguistic awareness. Examining 30 students in each of grades one, three, five, and seven, Shultz (1974) found that riddle comprehension increased steadily with age ($p < .001$) and strong evidence of a transition stage between the ages of six and eight. Sutton-Smith (1976) also reported results indicating a transition in comprehension of riddles in subjects ages six to eight. However, studying 14 children in grades one, two, and three, Fowles and Glanz (1977) found no significant relationship between riddle acquisition and grade.

In this study, 75 children in grades one and two were selected. The mean age of the 33 first-grade subjects was seven years, two months. The mean age for the 42 second-grade subjects was eight years, three months. The relationship between riddle comprehension and age was found to increase somewhat with age. Partial correlations controlling for age were used in addition to Pearson product-moment correlations to explore the remaining research questions.

> Research Question 3: Will there be a relationship between Riddle Comprehension Test scores and Gates-MacGinitie Reading Tests Vocabulary scores for first- and second-grade subjects?

Fowles and Glanz (1977) found the ability to retell riddles was not completely predictive of the ability to explain the riddles, nor was an orderly acquisition of riddle comprehension by grade found. They did find, however, some relationship between reading achievement and overall riddle comprehension. As reported in Tables 6 and 7, the ability to retell riddles was predictive of the ability to explain riddles for first- but not second-grade subjects in this study. A significant relationship was found between the ability to retell riddles and reading vocabulary achievement for first-grade children. For neither group was the riddle explanation/reading vocabulary relationship significant, and total comprehension of riddles related to reading vocabulary was significant only for first-grade subjects. Riddle recall accounted for 26% of the variance when the effect of age was partialed out.

> Research Question 4: Will there be a relationship between Riddle Comprehension Test scores and Gates-MacGinitie Reading Tests Comprehension scores for first- and second-grade subjects?

None of the research examined has explored the relationship of metalinguistic awareness with reading vocabulary and comprehension but rather overall or total reading achievement. Riddle comprehension scores were not significantly related to reading comprehension for either first- or second-grade subjects in this study.

> Research Question 5: Will there be a relationship between Riddle Comprehension Test scores and Gates-MacGinitie Reading Tests Total scores for first- and second-grade subjects?

As with findings testing the riddle comprehension/reading vocabulary relationship, the strongest relationship between Riddle Comprehension scores and GMRT Total scores was found for first-grade subjects. Riddle Recall scores were significantly predictive of general reading achievement for both groups. The ability to explain riddles proved not to be significantly related to general reading achievement, and the Total Riddle Comprehension/total reading achievement relationship was significant only for the first-grade group. These findings are supportive of the hypothesis set forth by Mattingly (1979)--that simple access may be the factor contributing to acquisition of literacy--and that flexibility, rather than mastery, may indicate control of language (Loban, 1973; Polermo & Malfese, 1972).

Research Question 6: Will there be a relationship between Phonological, Lexical, Surface Structure, and Deep Structure subtest scores and Gates-MacGinitie Reading Tests Vocabulary scores for first- and second-grade subjects?

Scattered research has indicated a developmental order of metalinguistic awareness beginning with phonological then lexical, surface-structure, and finally deep-structure awareness. Other research, however, has failed to support this sequence. As previously cited, a transition stage of acquisition has been found between the ages of six and eight years. Because of the small number of subjects, Fowles and Glanz (1977) did not break down their data by riddle type.

It was assumed that among subjects in this study with mean ages of seven years, two months for first-grade students and eight years, three months for second-grade students, a decreasing ability by riddle type and consequent relationship with reading achievement would be found. Results of this study did not substantiate this assumption. The deep-structure/reading vocabulary relationship for first-grade subjects was found to be the strongest ($p < .01$), followed by phonological and surface structure ($p < .05$) with lexical riddle comprehension ($p < .05$) proving the weakest predictor of reading vocabulary for first-grade children. None of the comprehension scores by riddle type proved to be significantly related to reading vocabulary for second-grade subjects.

Research Question 7: Will there be a relationship between Phonological, Lexical, Surface Structure, and Deep Structure subtest scores and Gates-MacGinitie Reading Tests Comprehension scores for first- and second-grade subjects?

In contrast to the findings regarding the comprehension by type of riddle/reading vocabulary relationship, none of the scores for comprehension by riddle type proved to be significantly related to reading comprehension. The formerly significant relationship between comprehension of phonological riddle comprehension and reading comprehension was not significant when controlled for age. As reported in Table 5, when age was related to riddle comprehension, only the Total Riddle Comprehension/age relationship for second-grade students reached significance. When controlled for the effect of age, comprehension of phonological, lexical, surface-structure, and deep-structure riddles did not prove to be predictive of reading comprehension for either first- or second-grade subjects.

> Research Question 8: Will there be a relationship between Phonological, Lexical, Surface Structure, and Deep Structure subtest scores and Gates-MacGinitie Reading Tests Total scores for first- and second-grade subjects?

Comprehension of all but lexical riddles was predictive of GMRT Total scores for first-grade subjects. Partialing out age had the effect of strengthening the deep structure/reading achievement relationship for first-grade children. Comprehension only of phonological riddles proved to be significantly related to Total reading scores for second-grade students.

Conclusions

Research comparing the ability in various types of metalinguistic awareness has presented varied findings. Moreover, few studies have explored the relationships between awareness of more than one linguistic aspect and reading achievement.

The results of statistical analysis have indicated that metalinguistic awareness increases somewhat with age. Results, however, have not supported a theory of developmental acquisition of awareness to linguistic forms in the particular order of phonological, lexical, surface, and then deep structure. Among the four aspects of metalinguistic awareness measured by the riddle comprehension task, the strongest relationships were among the ability to retell the four riddle types and reading vocabulary for first-grade subjects. Comprehension of deep-structure riddles proved to be the best predictor of reading vocabulary for this group, followed by phonological and surface structure, and finally comprehension of riddles presenting lexical ambiguity. These findings are in contrast to those of Shultz and Horibe (1974). Their results indicated that subjects detected phonological ambiguity more often than other types and surface-structure more often than deep-structure ambiguity.

Hirsch-Pasek et al. (1980) found lexical and deep-structure ambiguity proved to be the easiest and most strongly related to reading, with phonological and surface-structure ambiguity more difficult for children in grades one through six. Findings of this study are supportive of their results with the exception of the ranking of detection of lexical ambiguity in its relationship with reading achievement. Comprehension of lexical riddles showed the weakest although statistically significant relationship to reading vocabulary. These results are supportive of Pfrimmer (1980), whose examination of metalinguistic awareness and reading among first- and second-grade children also found semantic awareness to provide the weakest relationship to reading.

Ehri (1975), Scholl and Ryan (1980), Pfrimmer (1980), and Bohannon et al. (1984) stated that some awareness and control of syntax was predictive of reading achievement. Each study employed a different task to assess metalinguistic awareness. Only Pfrimmer examined awareness of linguistic aspects other than syntax or word order in relationship to reading. Although syntax ranked second in strength of relationship to reading, this study adds to the evidence supporting a link between awareness of syntactic form and reading achievement.

Differences in task demands and instruction are certainly variables that must be considered when evaluating research examining the relationship between metalinguistic awareness and reading. It can be concluded that results support the theoretical perspective that some general ability to focus on the surface properties of language at the level of access may be contributory, rather than prerequisite, to easing the task of learning to read, particularly in the very early stages of reading acquisition. The nature of this relationship warrants further exploration. One possibility is that an interactive relationship exists between the development of metalinguistic awareness and the development of the ability to read. Development of one may enhance and contribute to the development of the other.

Recommendations for Instruction

This investigation, along with results of other research, could have an effect on reading instruction if confirmed by further research in the area of metalinguistic awareness and reading acquisition. The position that children continue to develop their metalinguistic ability in the early grades and that variability in that development exists was supported. Classroom teachers and administrators should be aware of and provide for these differences in linguistic abilities and the role these abilities may play in acquisition of the ability to read.

The ability to use language to talk about language seems less well developed than simple access at this stage. A number of researchers have reported that primary-age children have difficulty with awareness at the conscious level and with linguistic terminology. It has been stated that significant growth in general metalinguistic awareness occurs during the primary years (Gleitman et al., 1972; Ryan, 1980; Scholl & Ryan, 1975). Furthermore, it is unclear whether metalinguistic awareness can be improved through instruction.

Teachers of beginning reading may find worthwhile time spent with oral-language activities that focus attention on the form of language, determination of children's knowledge and understanding of linguistic terms used in the classroom, and use of reading instructional approaches that minimize use of linguistic terms. Employing an approach such as Language Experience that is based on the child's level of linguistic development seems supported by the research.

Recommendations for Research

The attempt of this study to relate different levels and various aspects of metalinguistic awareness to reading achievement has little precedent other than the work of Fowles and Glanz (1977) and Pfrimmer (1980). Different results might have been attained if some other measure of metalinguistic awareness had been used. Results of the study suggest the need for further research.

Further exploration of metalinguistic awareness is needed. The development of metalinguistic awareness should be examined in children preschool through sixth grade or later. Tasks that tap awareness of various linguistic structures of oral language at different levels should be developed to provide additional data.

The development of metalinguistic awareness should be examined in children at the prekindergarten and kindergarten levels. Comparison of these findings to the children's later success in early reading and the effects of methods of instruction is suggested. Furthermore, metalinguistic awareness as it relates to reading achievement, especially comprehension, should be explored with students in the upper elementary grades. Finally, the effects of metalinguistic-awareness intervention on reading ability need to be explored.

At this point it appears likely that children who have developed some metalinguistic awareness at the level of access may have an advantage over unaware children in learning to read. It does not appear that there is a particular order to the development of linguistic forms. However, there remains much room for research on these questions.

APPENDICES

APPENDIX A

RIDDLES

RIDDLES

Phonological Ambiguity

Q. Why is a palm tree like a calendar?
A. It gives dates.

Q. What day of the week is the best for cooking bacon?
A. Friday.

Q. What do you call a witch who lives on the beach?
A. A sandwich.

Q. When are boys like bears?
A. When they are bare (bear) footed.

Lexical Ambiguity

Q. Why can't your nose be 12 inches long?
A. Because then it would be a foot.

Q. What has 18 legs and catches flies?
A. A baseball team.

Q. Why didn't the skeleton cross the road?
A. It didn't have the guts.

Q. What dog keeps the best time?
A. A watch dog.

Surface-Structure Ambiguity

Q. Why did the city boy go to the country?
A. He wanted to see the barn dance.

Q. What has 4 wheels and flies?
A. A garbage truck.

Q. Why is the man in the fish market stingy?
A. His job makes him sell fish.

Q. What room can no one enter?
A. A mushroom.

Deep-Structure Ambiguity

Q. What animal can jump higher than a house?
A. Any animal. A house can't jump.

Q. How do you keep fish from smelling?
A. Cut off their noses.

Q. What is the difference between a running dog and a running man?
A. The man wears trousers and the dog pants.

Q. What makes people bald-headed?
A. Having no hair.

APPENDIX B

RAW DATA

Raw Data for 75 Subjects

Subject Number	Age	Sex	Grade	PR	PE	LR	LE	SR	SE	DR	DE	TR	TE	TRC	RV	RC	RT
1	88	F	1	12	7	11	8	10	7	10	7	43	29	72	27	23	25
2	85	M	1	8	11	12	6	10	6	9	4	39	21	60	23	20	21
3	84	M	1	12	6	12	8	10	7	10	6	44	27	71	27	27	26
4	78	F	1	11	9	10	6	9	7	10	5	40	27	67	37	37	38
5	88	F	1	10	5	9	5	6	4	10	5	35	20	55	24	21	22
6	92	F	1	6	4	7	4	6	4	7	5	26	17	43	16	22	18
7	85	M	1	12	6	11	6	11	5	11	5	45	22	67	28	25	26
8	86	M	1	11	6	12	8	8	6	9	5	40	25	65	24	17	19
9	93	F	1	10	4	10	5	8	4	11	4	39	17	56	13	17	15
10	80	F	1	11	4	8	6	9	4	7	4	35	18	53	26	27	26
11	78	M	1	10	8	9	8	8	6	7	6	34	28	62	16	20	17
12	88	F	1	10	6	10	4	9	4	8	5	37	19	56	21	15	17
13	83	F	1	8	4	10	5	10	4	10	4	38	17	55	24	37	28
14	94	M	1	9	8	12	7	10	6	10	6	41	27	68	22	24	23
15	83	M	1	12	8	12	8	10	7	10	5	44	28	72	28	37	32
16	89	F	1	11	6	11	5	12	7	10	5	44	32	76	23	22	22
17	85	F	1	8	6	8	6	7	5	9	6	32	23	55	23	25	23
18	92	M	1	6	6	10	6	8	7	7	6	31	25	56	28	25	26
19	91	M	1	10	6	12	7	12	7	11	5	45	25	70	34	25	28
20	87	M	1	8	5	11	5	9	7	10	4	38	21	59	19	18	18
21	80	F	1	11	6	11	5	9	7	10	4	41	22	63	21	14	16
22	85	F	1	12	7	10	7	8	7	8	5	38	26	64	18	28	22
23	89	M	1	9	6	11	8	11	7	9	8	40	29	69	14	14	14
24	81	M	1	12	6	12	9	11	7	11	7	46	29	75	28	21	24
25	95	M	1	11	8	11	8	7	6	9	8	38	30	68	12	16	14
26	91	F	1	12	8	12	7	11	7	9	7	44	29	73	28	23	25
27	80	F	1	11	8	12	8	10	7	9	6	42	29	71	24	22	23
28	79	M	1	11	6	11	5	10	5	7	6	39	22	61	17	20	18
29	88	F	1	12	6	11	7	12	4	12	5	47	22	69	34	37	36
30	82	F	1	12	6	12	7	10	7	10	6	44	26	70	31	29	30
31	80	F	1	12	10	12	9	10	7	12	9	46	35	81	43	29	36
32	91	M	1	12	5	12	6	10	5	10	5	42	21	63	25	37	27
33	91	F	1	12	8	10	7	10	5	12	6	44	26	70	27	29	27
34	97	F	2	12	8	12	5	11	6	9	7	44	26	70	35	35	35
35	96	F	2	12	6	12	7	12	8	12	7	48	29	76	47	36	43
36	101	F	2	12	7	12	7	11	6	11	5	46	25	71	42	57	48
37	103	F	2	12	6	12	7	11	8	10	5	45	26	71	33	47	38
38	100	F	2	12	5	12	9	12	7	12	5	48	26	74	27	43	33
39	99	M	2	12	9	12	8	11	7	10	6	45	30	75	29	26	27
40	106	M	2	12	9	12	10	11	7	10	7	41	27	68	40	52	44
41	107	M	2	12	5	12	5	11	6	12	4	47	20	67	28	31	29

Subject Number	Age	Sex	Grade	PR	PE	LR	LE	SR	SE	DR	DE	TR	TE	TRC	RV	RC	RT
42	101	F	2	12	10	12	8	12	8	12	4	48	30	78	56	43	50
43	102	M	2	12	8	12	8	9	7	10	7	43	30	73	31	43	35
44	108	M	2	10	8	12	8	10	9	11	7	43	32	75	56	47	56
45	102	M	2	12	5	12	7	12	6	8	8	44	26	70	27	31	29
46	98	M	2	12	8	12	7	11	6	12	6	47	27	74	38	47	41
47	106	M	2	12	8	12	8	10	7	12	7	46	30	76	25	18	22
48	91	F	2	12	11	12	8	10	9	12	9	46	31	83	32	43	36
49	99	M	2	11	6	12	7	8	4	9	4	40	21	61	27	35	30
50	97	F	2	12	6	12	8	11	6	8	5	43	25	68	42	31	37
51	93	M	2	12	11	12	10	11	8	11	9	46	38	84	31	36	34
52	107	F	2	11	7	11	5	10	7	9	7	41	26	67	42	36	39
53	109	M	2	11	8	9	8	11	7	11	7	42	30	72	25	28	26
54	108	M	2	10	7	11	8	10	7	11	8	42	30	72	27	16	22
55	98	M	2	12	7	11	7	11	6	10	7	44	27	71	33	52	38
56	91	F	2	11	9	11	7	9	5	10	6	41	27	68	36	35	37
57	95	F	2	12	6	10	8	10	10	7	5	41	26	67	25	22	23
58	91	M	2	12	9	12	9	10	7	9	6	43	33	74	31	39	34
59	90	M	2	11	7	12	9	11	9	10	7	44	32	76	35	22	27
60	94	F	2	11	7	12	9	12	8	11	5	46	29	75	40	28	34
61	100	M	2	12	7	12	6	12	7	12	8	48	28	76	44	31	38
62	94	F	2	12	7	12	6	12	7	11	7	47	27	74	27	25	26
63	99	F	2	12	7	11	7	11	6	12	7	46	27	73	24	23	23
64	102	M	2	12	7	10	7	10	7	10	8	42	29	71	29	35	31
65	107	M	2	9	7	11	8	10	6	11	5	41	26	67	32	43	36
66	94	M	2	12	6	12	7	10	5	11	4	45	22	67	56	57	59
67	94	F	2	11	7	10	7	11	5	10	6	42	25	67	29	43	34
68	100	M	2	12	11	11	9	12	9	12	9	47	38	85	56	57	64
69	96	F	2	12	12	12	10	12	7	12	11	48	40	88	44	57	50
70	97	F	2	12	10	12	7	10	8	12	8	46	33	79	47	57	59
71	94	M	2	12	9	12	8	12	8	12	8	48	33	81	26	33	28
72	89	F	2	12	10	12	10	6	10	12	8	48	28	76	56	57	64
73	98	F	2	12	8	12	9	10	6	9	6	43	29	72	56	33	43
74	93	M	2	12	12	12	7	12	10	11	6	47	35	82	56	52	59
75	100	M	2	12	4	12	4	11	4	12	5	47	17	64	51	57	56

APPENDIX C

LETTER TO PARENTS

Dear Parents,

Your child's class has been selected to participate in a study planned to investigate the level of language development necessary for beginning reading and the relationship between language development and reading achievement. Students will be asked to retell and explain sixteen riddles prepared by Mrs. Claus. They also will take the Gates-MacGinitie Reading Test. Mrs. Claus has taught courses with Grand Valley State College's School of Education for several years and has worked closely with a number of teachers in the Jenison Schools. She is respected by the teachers for her knowledge of reading instruction.

This project has the approval of Dr. Joseph Shulze, Assistant Superintendent of Curriculum; Mrs. Esther Raterink, Reading Consultant; and Mr. Don Weirenga, Building Principal.

We are eager to be involved in this research because we believe that it will benefit the children. We trust you will be willing to have your child included in the study. If for any reason you would prefer that your child not be included, please inform me so that we can make other arrangements.

Sincerely,

Building Principal

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