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A Study Of The Relationship Of Reading Achievement, Linguistic Awareness, And Conservation In Third Grade Children

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A STUDY OF THE RELATIONSHIP OF READING ACHIEVEMENT, LINGUISTIC AWARENESS, AND CONSERVATION IN THIRD GRADE CHILDREN

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Abstract of the Dissertation

The purpose of this study was to investigate the competencies of third grade students on linguistic awareness and conservation tasks, and to determine if these skills were related to reading achievement. Two measures of linguistic awareness were used in this study, the Concepts About Print (Sand) Test and the "Technical Language of Literacy" ("TLL") subtest of the Linguistic Awareness in Reading Readiness Test. The Concept Assessment Kit--Conservation (CAK-C) was used to determine conservation skills. The possible relationship between conservation and linguistic awareness was also explored.

Procedure. Eighty-two third grade students were drawn from two Title I schools in a large city school district. Participants were chosen based on their total reading score on the Stanford Achievement Tests--Reading (SAT-R). All students scoring above the 50th percentile (37) were included in the study. In order to have approximately the same number of students scoring below the 50th percentile, twelve students were randomly selected, using the table of random numbers, from each stanine below the 50th percentile. Selected children were then tested individually on the CAK-C, Sand, and the "TLL."

Findings. The results of this study showed that there was a significant relationship between the third grade students' linguistic awareness ability and their vocabulary, comprehension, decoding, and total reading scores on the SAT-R. Correlations between the Sand and the "TLL" and the SAT-R were significant ($p < .001$) and ranged from $r = .417$ to .660. All of the SAT-R subtests were significantly ($p < .001$) and moderately correlated with the CAK-C with the exception of decoding. The decoding score and the CAK-C correlation was significant ($p < .01$), but the correlation was small, $r = .291$. All three independent variables were significantly correlated to each other. The correlation between the two measures of linguistic awareness was $r = .644$. The CAK-C correlated moderately with the "TLL," $r = .388$. The CAK-C correlation with the Sand was small, $r = .290$.

The Sand was the best predictor of reading achievement, with the exception of the vocabulary score, which was best predicted by the "TLL." The CAK-C was the second best predictor of all the subtests of the SAT-R. No significant differences were found between the sexes on conservation, reading achievement and linguistic awareness.

Conclusions. The linguistic awareness and conservation skills of third grade students are both significantly correlated to reading achievement. The effects of linguistic awareness on reading achievement continue beyond the readiness level. Conservation was not as strongly correlated to reading achievement as linguistic awareness. Conservation and linguistic awareness were overlapping, both measuring, in part, similar abilities.

Educational Recommendations. A holistic approach to reading instruction received support. Children need to be taught reading in a

setting in which they learn the communicative aspects of reading. More emphasis in the early primary grades needs to be placed on linguistic awareness skills. Remedial readers need to be screened on a linguistic awareness instrument to determine if they have acquired the necessary terminology and concepts. The importance of oral language skills for cognitive development and acquiring linguistic awareness skills cannot be overlooked. Time needs to be spent helping children acquire oral language before they can successfully deal with written language.

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Chapter 1

INTRODUCTION

Teaching children to become successful readers is of primary interest to elementary educators. The process of identifying the skills and competencies children need for reading continues to dominate the literature. However, one commentator has spoken for many in saying that "our ignorance about how children learn is still enormous, despite all the research that has been carried out."[1]

This study investigates the competencies of third grade students on several tasks thought to be prerequisites for successful reading achievement. Do these students have knowledge of terminology and concepts used in reading instruction? And, does their cognitive developmental level have a bearing on their reading achievement? This study will provide further information about the factors that relate to reading achievement.

Recently the argument has been advanced that reading requires the understanding of some very basic concepts. These concepts are thought to be even more basic than discriminating letters and attaching sounds to letters and letter combinations.[2] The point being taken by

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[1] John Downing, Reading and Reasoning (New York: Springer-Verlag, 1979), p. 5.

[2] T. Gary Waller, Think First, Read Later! (Newark, Delaware: International Reading Association, 1977), p. 10.

researchers in this area[3] is that there is a need for linguistic awareness. Children must grasp the abstract nature of written language and understand the technical vocabulary of reading in order to learn to read successfully. These researchers are saying that memorizing speech-to-print relations, such as sounds and letters, is not all that is important in the very beginning of learning to read. There is an additional need to understand the "featural concepts" that are necessary for reasoning about these relationships.[4] According to this view, linguistic awareness is defined to include the following concepts and terminology. Children need to know "what a book is and what you find in books."[5] They need to know significant concepts about printed language such as the uses of punctuation, the function of space, what a letter is, what a word is, what a sound is, and that the print tells the story, not the picture.

Is it possible that children having trouble in the area of linguistic awareness may not have reached levels of cognitive development necessary for dealing with parts and wholes and their relationships? J. F. Reid hypothesized that consciously and carefully developed linguistic awareness might well make a difference in children's general

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[3]J. F. Reid, "Learning to Think About Reading," Educational Research, IX (November, 1966), 56-62; John Downing, "Children's Concepts of Language in Learning to Read," Educational Research, XII (February, 1970), 106-112; Hazel Francis, "Children's Experience of Reading and Notions of Units in Language," British Journal of Educational Psychology, XLII (February, 1973), 17-23; Martha Evans, Nancy Taylor, and Irene Blum, "Children's Written Language Awareness and Its Relation to Reading Acquisition," Journal of Reading Behavior, XI (Spring, 1979), 7-19.

[4]Downing, Reading and Reasoning, p. 20.

[5]Waller, loc. cit.

logical thinking as well as their learning to read.[6] Is there a connection between linguistic awareness and the more general theoretical accounts of children's thinking examined by Jean Piaget?

Piaget's theory of cognitive development has implications for those involved in teaching young children to read. Within his theory of how children learn and grow intellectually he has defined a sequence of cognitive development. Two levels in this sequence become important for children learning to read: the intuitive sub-stage of the preoperational level (from approximately four years old to seven years old), and the concrete operational level (from approximately seven years old to 11 years old).

During the preoperational level, children are very egocentric, demonstrating an inability to take the role of another person.[7] This is particularly evident in the area of language and communication. All children's thinking is done in terms of themselves. Children have difficulty understanding others accurately.[8] When children are functioning at the preoperational level, teachers can be misled into believing that they understand more than they do. Piaget found that preoperational children do not even understand the communication purpose of speech. John H. Flavell, in reviewing Piaget's work in this area, cites a basic failure of a young child "to orient oneself towards the listener: what he will and will not understand, what will and will not

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[6] Reid, op. cit., p. 62.

[7] John H. Flavell, The Developmental Psychology of Jean Piaget (Princeton, New Jersey: D. Van Nostrand Co., 1963), p. 156.

[8] C. M. Charles, Teacher's Petit Piaget (Belmont, California: Fearon-Pitman Publishers, Inc., 1974), p. 7.

confuse him."[9] Piaget found that, because of their egocentric thinking, children before seven or eight have "no desire either to communicate with others or to understand them."[10]

Piaget defined the child's inability to grasp the notion of conservation to be the "clearest indication of the existence of a preoperatory period."[11] The term "conservation" refers to the ability to consider both the whole and the various arrangements of its parts at the same time.[12] A child that has acquired the ability to conserve can remember the whole and hold it constant in his mind while dividing it into parts, regrouping the parts, or making changes in the appearance of the parts; and then reverse the operation and return to the whole.[13]

Piaget found changes such as these to be "symptoms" of reorganization within the child's intellectual structures.[14] The child's thought processes are emerging into a system of reversible mental operations.

How does this reorganization within the child's intellectual structure change the child's thinking? How does the thinking of the child who has the ability to conserve differ from the thinking of the nonconserver? Evidence seems to suggest that the centered, rigid,

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[9]Flavell, op. cit., p. 273.

[10]Jean Piaget, Language and Thought of the Child (New York: Humanities Press Inc., 1959), p. 126.

[11]Jean Piaget and Barbel Inhelder, The Psychology of the Child (New York: Basic Books, Inc., 1969), p. 97.

[12]Charles, op. cit., p. 14. [13]Ibid.

[14]Philip A. Cowan, Piaget with Feeling, Cognitive, Social, and Emotional Dimensions (New York: Holt, Rinehart and Winston, 1978), p. 191.

immobile, and irreversible structures typical of preoperational thought give way to more flexible, mobile, decentered, and reversible thinking.[15] With the transition to concrete operations, the child is more likely to be able to organize experiences into consistent wholes, make rational sense of his experiences, and view events from different perspectives.[16] In terms of social exchanges there is a gradual transition from a "lack of coordination or differentiation between the child's own point of view and that of others to a state of coordination of points of view and cooperation in action and communication."[17]

Although Piaget did not deal directly with the issue of reading, his theory indicates that because of the nature of the reading process, children having the ability to conserve would learn to read more easily. His theory also suggests that conservers, because they are more concrete operational thinkers, would better understand the abstract nature of the written language code and be better able to understand the technical vocabulary of reading.

Purpose of the Study

Despite much research and many corrective measures we still have children reaching third grade with few reading skills. This study looks at concepts thought to be basic for reading readiness. In his recently published book, Reading and Reasoning, John Downing states, "probably one of the most important theoretical issues in reading research in the coming years will be this question as to what extent awareness of one's

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[15] Flavell, op. cit., p. 163. [16] Charles, op. cit., p. 15.

[17] Piaget and Inhelder, op. cit., p. 129.

own linguistic behavior facilitates learning to read."[18] He also saw a need for controlled experimentation to "investigate the causal relationship between children's development of linguistic awareness and their acquisition of reading skill."[19] By looking at older children, third graders, it will be possible to see if there is still confusion and a lack of understanding of the total activity of reading and its technical concepts. In the course of reading instruction are we making unwarranted assumptions about children's understanding of linguistic concepts used in teaching reading?[20] Marie Clay indicated that for problem readers "confusions about these arbitrary conventions of our written language code tend to persist."[21]

Also, because a definite relationship between concrete operations and reading success has not been firmly established, this study will add to the body of research in the area. And, since the relationship between cognitive development and linguistic awareness has not been established, this study will provide a starting point for further research.

Statement of the Problem

Research seems to indicate a positive connection between conservation and learning to read. Research also seems to indicate that

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[18] Downing, Reading and Reasoning, p. 31.

[19] Douglas Ayers and John Downing, "Children's Linguistic Awareness and Reading Achievement" (unpublished monograph furnished by the authors).

[20] Downing, "Children's Concepts of Language in Learning to Read," p. 106.

[21] Marie M. Clay, The Early Detection of Reading Difficulties: A Diagnostic Survey (Exeter, New Hampshire: Heinemann Educational Books, 1972), p. 10.

children who possess a linguistic awareness about the connection between oral and written codes and understand the technical vocabulary used in reading instruction are more likely to meet with success when learning to read.

This study will investigate how children differ in terms of linguistic awareness beyond the readiness level. Are children who understand the abstract nature of written language and the technical vocabulary of reading better readers than those who do not? Also, the relationship between cognitive development, as measured by their ability to conserve, and reading achievement needs further investigation. The possible relationship between linguistic awareness and cognitive development will be explored.

The questions become, do children need to be able to conserve and be thinking at this more logical level before they are able to have successful reading experiences, and is the ability to think more logically related to children's ability to grasp the abstract nature of written language (linguistic awareness)? What is the relationship between understanding the abstract nature of written language and the ability to conserve as defined by Piaget?

Research Questions

The questions, in terms of reading success, that arise from research in cognitive development carried out by Piagetian researchers and those involved in linguistic awareness studies are many. Research is currently under way to answer some of these questions. In order to investigate some of the questions generated by the literature and those

raised in the previous section, the following questions were considered in this study:

Q_1: Is there a relationship between the vocabulary, comprehension, decoding, and total reading score of third grade students and their level of linguistic awareness?

Q_2: Is there a relationship between the vocabulary, comprehension, decoding and total reading score of third grade students and their conservation ability?

Q_3: Is there a relationship between conservation ability and the level of linguistic awareness?

Q_4: Which is the best predictor of third grade reading achievement, linguistic awareness or cognitive development?

Q_5: Are there differences between boys and girls in their ability to conserve, linguistic awareness, and reading achievement?

Limitations

Findings of the study must be viewed with the following limitations. It will be limited to third grade students in two Title I schools in the Sacramento City Unified School District. The generalizability of the results is restricted as a result of the sample. A larger sample selected in a random fashion from a larger geographical area would have increased generalizability. Also, since the Title I status of a school is based in part on the socioeconomic status (SES) of the school population, generalizability would be limited to students living in similar environments.

The measures of linguistic awareness, conservation and reading achievement are limited in accordance with the validity and reliability of the test instruments. The ages of the third grade students exceeded those in the reliability and validity studies for the linguistic

awareness test instruments, and that factor constitutes a further limitation.

Definition of Terms

There are a number of terms used frequently in this dissertation which may require some explanation. The following terms will be used consistently as defined below.

Conservation. Skills measured by the Concept Assessment Kit--Conservation (CAK-C), based on the cognitive developmental theory of Jean Piaget.

Decoding Skills. Skills measured by the word study skills subtest of the Primary Level II Battery of the Stanford Achievement Tests--Reading.

Linguistic Awareness (or, as it is sometimes called, Metalinguistic Awareness). Skills measured by the Concepts About Print (Sand) Test and subtest 3 of the Linguistic Awareness Reading Readiness Test (LARR) called "Technical Language of Literacy" which both measure what children know about the written language code and its relations to oral language, and also determine understanding of the significant concepts about printed language (the language of instruction) such as "word," "letter," and "sound."

Comprehension. Skills measured by the reading subtest (word reading and paragraph comprehension) of the Primary Level II Battery of the Stanford Achievement Tests--Reading.

Total Reading Score. Score derived from combining the decoding and comprehension subtest scores on the Stanford Achievement Tests--Reading.

Vocabulary Skills. Skills measured by the vocabulary subtest (vocabulary and concept acquisition independent of decoding skills) of the Primary Level II Battery of the Stanford Achievement Tests--Reading.

Summary and Organization

Linguistic awareness and cognitive development are thought to affect reading achievement. Generally, studies have used kindergarten and first graders as subjects. This study will examine third grade students to see if either concept is related significantly to reading achievement and also look at the relative value of the instruments in predicting reading achievement.

Chapter 1 has outlined the rationale for this study, along with a statement of the problem to be investigated. Terms were defined and the limitations discussed. The remainder of the dissertation is organized in the following manner.

Chapter 2 reviews related literature from three perspectives. In order of presentation, they are: (1) research involving the connection between linguistic awareness and reading; (2) research which relates Piagetian developmental levels to reading achievement; (3) studies that look at linguistic awareness and cognitive development simultaneously.

Chapter 3 presents the procedures employed. This chapter includes a description of the characteristics and treatment of the subjects, along with an explanation of the test instruments, data collection procedures, and statistical methods used in the study.

Chapter 4 presents the findings related to the questions raised in Chapter 1. Chapter 5 summarizes the study, presents conclusions and recommendations based on the results of the statistical interpretation.

Chapter 2

REVIEW OF THE LITERATURE

Chapter two reviews literature relevant to the problem under consideration. The chapter is divided into three sections. The first section deals with the two conflicting views on the need for linguistic awareness when learning to read and reviews research conducted thus far in determining the relationship between linguistic awareness and reading. The second section discusses the application of Jean Piaget's views about cognitive developmental levels at the time children are learning to read and reviews research regarding cognitive levels as they relate to reading achievement. The final section deals with the few recent studies focusing on conservation and linguistic awareness and their relationship to reading instruction.

Linguistic Awareness and Reading

Although reading researchers sometimes seem to agree on very little, there is a consensus about the importance of the relationship between language development and the reading process. Most researchers would agree with Russell Stauffer that the "oral language facility provides the foundation needed to make the transition from oral to printed language."[1] However, there is disagreement as to how aware children are of their own language and how much they need to know about

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[1]Russell Stauffer, Directing Reading Maturity as a Cognitive Process (New York: Harper and Row, 1969), p. 153.

language to profit from reading instruction. The extent to which awareness of one's own linguistic behavior facilitates learning to read is seen by John Downing as one of the most important theoretical issues in reading research in the coming years.[2]

Linguistic awareness takes into account children's understanding of two aspects of the reading task: understanding its purpose and understanding its technical characteristics.[3] Another term often used in conjunction with linguistic awareness is metalinguistic awareness. Ioanna Papandropoulou and Hermaine Sinclair called it metalinguistic competence and defined it as the capacity to think about language.[4] Courtney Cazden defined metalinguistic awareness as "the ability to make language forms opaque and to attend to them in and for themselves."[5] These definitions seem synonomous with the previous definition of linguistic awareness. Others seem to be using metalinguistic awareness in conjunction with children's understanding of the language of instruction and their understanding of the way books operate. This definition indicates that they are defining metalinguistic awareness as just a part of linguistic awareness.[6] Generally, researchers seem to be defining linguistic awareness as an understanding of a connection between oral and written language. It is knowledge of significant

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[2]Downing, Reading and Reasoning, p. 31. [3]Ibid., p. 36.

[4]Ioanna Papandropoulou and Hermine Sinclair, "What is a Word?" Human Development, XVII (July-August, 1974), 241.

[5]Courtney B. Cazden, "Play and Metalinguistic Awareness: One Dimension of Language Experience," Urban Review, VII (January, 1974), 29.

[6]Martha Evans, Nancy Taylor, and Irene Blum, "Children's Written Language Awareness and Its Relation to Reading Acquisition," Journal of Reading Behavior, XI (Spring, 1979), 12.

printed language concepts and terminology used in reading instruction such as: the uses of punctuation, the function of space, what a letter is, what a word is, what a sound is, and terminology used for location: first, last, beginning and end.

This first section of the chapter will have the following seven subsections: theoretical considerations, cognitive clarity, research about functional concepts, research about featural concepts, Concepts About Print (Sand) Test, "Technical Language of Literacy," and summary.

Theoretical Considerations

Linguistic awareness takes into account children's understanding of two aspects of the reading task: understanding its purpose and understanding its technical characteristics.[7] It is the ability to analyze language, think about it and make judgments about it. A number of researchers have taken conflicting positions on the role of language awareness in reading instruction. There are two schools of thought on this issue. There are those who see the need for some awareness and those who see the need only to use the language, not necessarily have any awareness of it.

The position supporting the need for linguistic awareness has gained credibility through some recent research. Jeanne Chall, in her comprehensive review of methodology in learning to read, found that those methods that viewed beginning reading as different from mature reading, and emphasized learning the printed code for the spoken language, produced better results than those that emphasized meaning in

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[7]Downing, Reading and Reasoning, p. 31.

the early stages. Her review further showed as unfounded the fear that readers who learn in a program with initial code emphasis do not read for meaning.[8] She was careful to give the "code-emphasis method" superiority over the "meaning-emphasis method" only in beginning reading instruction.[9]

Downing also has argued that beginning and later reading instruction should differ. Early readers, according to Downing, may not be able to go directly to meaning during the reading process because they must first learn the "functions and techniques of the various tasks" involved in the skill of reading. He believes that in the later phases of the skill-learning process a reader performs the skill without conscious awareness but that for the beginner this is not possible.[10]

These researchers have said that the beginning reading process differs from the process used by fluent readers. The three-stage skill-learning process outlined by Paul M. Fitts and Michael I. Posner indicated that during the early skill-learning phase, called the cognitive phase, it is necessary to attend to cues, events and responses that, as the skill becomes learned, go unnoticed. It is also during this early phase that the learner tries to "understand the task and what it demands."[11] If this initial phase is ignored, Downing felt that the child may be more confused about the reading process and this confusion may extend for a longer period of time than if children were introduced

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[8]Jeanne Chall, Learning to Read: The Great Debate (New York: McGraw-Hill, 1967), p. 307.

[9]Ibid. [10]Downing, Reading and Reasoning, p. 34.

[11]Paul M. Fitts and Michael I. Posner, Human Performance (Belmont, California: Brooks/Cole, 1967), pp. 11-12.

to basic concepts of language during the initial phases of reading instruction. He also saw a need for a more comprehensive theory of learning to read that takes into account both the functional purpose of reading and the featural and technical language concepts involved in the reading process.[12] Coming from two directions, the following researchers were found to be supportive of the need for linguistic awareness. Ignatius G. Mattingly, D. B. Elkonin, L. S. Vygotsky and Charles Read saw a need for conscious awareness of the role of language in order to separate objects and concepts from the words used to represent them. The consensus of these researchers was that those having difficulty with the task of reading lack knowledge about the functions and techniques necessary to make the connection between oral and written language. Harris B. Savin and M. D. Vernon saw the need for linguistic awareness from the vantage point of their work with children with reading difficulties. In the following pages some theoretical background will be noted for these positions, followed by information about the perspective of those taking an opposing viewpoint.

Mattingly took the position that speaking and listening were primary linguistic activities and reading is a secondary activity. He did not see reading and listening as parallel processes. Because reading is a secondary activity, it is dependent upon the readers' awareness of those primary linguistic activities.[13] He defined reading

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[12] Downing, Reading and Reasoning, p. 36.

[13] I. G. Mattingly, "Reading, the Linguistic Process, and Linguistic Awareness," Language by Ear and by Eye, eds. James F. Kavanagh and Ignatius G. Mattingly (Cambridge: MIT Press, 1972), p. 137.

as a "deliberately acquired language-based skill."[14] He went on to say that without linguistic awareness much of what we call thinking would be impossible since in his view linguistic awareness allows the individual to "consciously represent things by names and complex concepts by verbal formulas."[15]

Elkonin, a Soviet psychologist, believed this developmental process of language awareness during the preschool years to be "one of the most essential preconditions for the new stage in the mastery of the phonological aspect of speech, the one associated with learning literacy--reading and writing."[16] He cited his Soviet colleague Luria's "glass theory" as how children initially view language. He quoted Luria as saying,

> The word may be used but not noticed by a child, and frequently it presents things seemingly like a glass through which the child looks at the surrounding world, not making the word itself the object of awareness and not suspecting that it has its own existence, its own aspect of construction.[17]

Vygotsky said much the same thing when he talked about the child who knows the name of an object but is not aware that the name is separate from the object's attributes. According to Vygotsky, semantically the child starts from the whole and only later begins to master the separate

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[14] Ibid., p. 140. [15] Ibid.

[16] D. B. Elkonin, "Development of Speech," The Psychology of Preschool Children, eds. A. V. Zaporozhets and D. B. Elkonin (Cambridge: MIT Press, 1971), pp. 168-169.

[17] A. R. Luria, "Opathologii grammaticheskikh operatsy," (Concerning patholoy of grammatical operations) IZestia APN RSFSR. Vyg. 3, 1946, p. 61, cited by D. B. Elkonin, "Development of Speech," The Psychology of Preschool Children, eds. A. V. Zaporozhets and D. B. Elkonin (Cambridge: MIT Press, 1971), pp. 111-186.

semantic units.[18] Elkonin went on to say that for the acquisition of literacy, children need a "clear conception about the phonetic composition of words."[19]

Charles Read, through his work with the spelling abilities of preschool children, determined that children are bringing some knowledge of English phonology to beginning reading and writing. Regardless of the role of individual development he finds that it is no longer possible to assume that children approach the reading task without "prior conception of its structure." Children are, according to Read, making inferences about the sound system of their language before they learn to read.[20]

Savin, taking much the same position as Elkonin, states that the prevailing theory as to why children fail to learn to read is not satisfactory and fails to identify why large numbers of children have reading difficulties. He found those unable to read at the end of first grade to be also unable to analyze syllables into phonemes. They had not, by six or seven years of age, acquired a skill that children without reading problems had acquired earlier. He saw no point in teaching children that the letter "s" has the sound /s/ if they are unaware of phonemes.[21]

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[18] L. S. Vygotsky, Thought and Language (New York: John Wiley and Sons, 1962), p. 126.

[19] Elkonin, op. cit., p. 169.

[20] Charles Read, "Pre-School Children's Knowledge of English Phonology," Harvard Educational Review, XLI (February, 1971), 1-34.

[21] Harris B. Savin, "What the Child Knows about Speech When He Starts to Learn to Read," Language by Ear and by Eye, eds. James Mattingly and F. Kavanagh (Cambridge: MIT Press, 1972), p. 319.

Vernon, also, found that children with reading difficulties were unable to "analyze word shapes and sounds systematically and associate them together correctly."[22] The inability to recognize the correspondence between printed letter shapes and the phonetic units stemmed from a lack of "conceptual reasoning necessary to abstract the essential characteristics of printed and spoken words." She found the basic characteristic of reading disability to be "cognitive confusion and lack of a system" in regard to these essential characteristics.[23]

The theoretical position taken by these researchers indicates two major factors as to why children might not understand the functional and featural concepts associated with reading. The first is that children beginning the reading process have only a vague idea about the communication process, either in speech or writing. Piaget has indicated that up until the age of seven or eight a child's speech remains egocentric and communication is not the major function of his speech.[24] Vygotsky found also that school beginners were unfamiliar with writing and had only a vague idea of the communication functions of written language.[25] The second factor is that children are in a state of "cognitive confusion." They lack the skills, such as being able to segment syllables, identify word boundaries, and understand print

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[22]M. D. Vernon, Backwardness in Reading (Cambridge: University Press, 1957), p. 71.

[23]M. D. Vernon, Reading and Its Difficulties (Cambridge: University Press, 1971), pp. 77-78.

[24]Jean Piaget, Language and Thought of the Child (New York: Humanities Press, 1959), p. 49.

[25]Vygotsky, op. cit., p. 99.

concepts necessary to tie together written and oral language. They lack the terminology and the language of instruction necessary to understand what the teacher is talking about during reading instruction.

There are those who do not see the need for children to be able to think about language. Those who hold this view take the position that children do not need to understand what they are doing. These researchers do not see the importance of understanding the technical characteristics. They have focused on the communication function of the reading act.[26] According to this view, the child needs only to pick up the common linguistic patterning in listening and reading. They argue that children must be able to use language but that they do not need to be aware of or understand the characteristics of the language they use.

Frank Smith is one of the major proponents of this position. He believes that children come to reading instruction with experiences involving all the cognitive skills involved in learning to read. He gives each child credit for having a "rich and fully functioning knowledge of the spoken aspects of his language."[27] And then he says that "one of the most dramatic discoveries in reading in recent years has been that children clearly know so much about reading right at the beginning."[28] He found it "quite an unfounded assumption that reading instruction must teach children about language."[29]

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[26]Downing, Reading and Reasoning, p. 36.

[27]Frank Smith, Understanding Reading (New York: Holt, Rinehart and Winston, 1971), p. 223.

[28]Frank Smith, Psycholinguistics and Reading (New York: Holt, Rinehart and Winston, 1973), p. 8.

[29]Smith, Understanding Reading, p. 223.

Smith does not negate the importance of language but feels that children must discover the redundancies in written language for themselves. He says that the critical rules of featural, orthographic and semantic redundancy are not accessible to our awareness and we acquire and use them quite unconsciously even as adults.[30]

Yetta Goodman and Carolyn Burke are in agreement with Smith. They acknowledge the fact that the language and thought processes the child uses are abstract and complex but go on to say that children are required only to use them, not understand them.[31] They see preschool children already developing as "effective receivers of written language."[32]

Likewise, Kenneth Goodman does not separate oral and written language. He sees written language as an "alternate language form" and not a "secondary representation."[33] The child, already a competent language processor, knows how to get information and meaning from language. According to Goodman, the child just has not yet learned an "alternate parallel mode" of doing it. He sees written and oral language as different in use rather than different in process, and what the child knows about language in each case is exactly the same. He focuses on the communication function of reading and indicates that if children

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[30]Ibid., p. 225.

[31]Yetta Goodman and Carolyn Burke, "Reading: Language and Psycholinguistic Bases," Reading: Foundations and Instructional Strategies, eds. Pose Lamb and Richard Arnold (Belmont, California: Wadsworth Publishing, 1976), p. 110.

[32]Ibid., p. 109.

[33]Kenneth S. Goodman, "Do You Have to Be Smart to Read?" Reading Teacher, XXVIII (April, 1975), 627.

were more aware of this function of written language they would learn to read more easily.[34] Goodman sees meaning as the significant factor. In other words, children are not aware of the language because they are concerned with meaning.

Researchers taking the above position may not be in disagreement with the proponents of linguistic awareness. It may well be a difference in focus. If there is any validity in the skill-learning process proposed by Fitts and Posner, both theoretical positions may not be as different as they appear during initial examination. Linguistic awareness proponents are dealing with children in the initial phases of the skill-learning process. Those emphasizing meaning and the communication aspects of reading seem to be dealing with a later skill-learning phase in which successful readers are found.

Since many children find difficulty in the initial phases of learning to read, research supporting the need for linguistic awareness in beginning reading continues to advance. Downing has extended the view introduced by Vernon that "cognitive confusion" plays a major role in reading difficulties. His research has led him to believe that "cognitive confusion" is caused by a lack of linguistic awareness. He has developed a theory of learning to read that has linguistic awareness as its main ingredient.[35]

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[34]Kenneth S. Goodman, "Manifesto for a Reading Revolution," Claremont Reading Conference, Fortieth Yearbook (Claremont, California: Claremont Graduate School, 1976), pp. 16-28.

[35]Downing, Reading and Reasoning, p. 37.

Cognitive Clarity Theory

Downing's study and research into linguistic awareness led to the "Cognitive Clarity Theory." He summarizes his theory into the following eight postulates:

> (1) Writing or print in any language is a visible code for those aspects of speech that were accessible to the linguistic awareness of the creators of that code or writing system; (2) this linguistic awareness of the creators of a writing system included simultaneous awareness of the communicative function of language and certain features of spoken language that are accessible to the speaker-hearer for logical analysis; (3) the learning-to-read process consists in the rediscovery of (a) the functions and (b) the coding rules of the writing system; (4) their rediscovery depends on the learner's linguistic awareness of the same features of communication and language as were accessible to the creators of the writing system; (5) children approach the tasks of reading instruction in a normal state of cognitive confusion about the purposes and technical features of language; (6) under reasonably good conditions children work themselves out of the initial state of cognitive confusion into increasing cognitive clarity about the functions and features of language; (7) although the initial stage of literacy acquisition is the most vital one, cognitive confusion continues to arise and then, in turn, give way to cognitive clarity throughout the later stages of education as new sub-skills are added to the student's repertory; (8) the cognitive clarity theory applies to all languages and writing systems. The communication aspect is universal, but the technical coding rules differ from one language to another.[36]

Through the explanation of his theory, Downing has defined two groups of concepts that children must understand to be successful readers: (1) functional concepts and (2) featural concepts.[37] In terms of the children's understanding of the reading task, he breaks the concepts down into two aspects: (a) understanding its purpose and (b) understanding its technical characteristics.[38]

In the following sub-sections, research done in these two areas is reviewed. Following these, research involving the two linguistic awareness measures used in this study, Concepts About Print (Sand) Test

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[36]Ibid. [37]Ibid., p. 6. [38]Ibid., p. 36.

and the third subtest, "Technical Language of Literacy," of the Linguistic Awareness in Reading Readiness Test are reviewed separately.

Research About Functional Concepts

Knowledge of functional concepts means the ability to reason about the purpose of reading and writing. Reading and writing need to be seen as a way of communicating a message and also a way for an individual to remember words or ideas.

J. F. Reid's article, "Learning to Think About Reading," examined a group of five-year-old children's thinking about the functions and purpose of reading. Reid found in her study that children regarded reading, prior to experiencing it, as a mysterious activity that they came to with only the vaguest of expectations. Children were also unable to recognize the connection between writing and reading. To most of the children, writing was isolated numerals or single letters.[39]

Downing's replication of Reid's study in 1970 also found that young beginners in the reading process had difficulty understanding the purpose of written language. They confirmed Reid's conclusions that young children have only a vague notion of the purpose of the written form of language and what activities the reading task consists of.[40]

George E. Mason questioned three, four, and five-year-old preschoolers as to whether they liked reading and if they could read on their own. He found that most of the children believed that they could

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[39] J. F. Reid, "Learning to Think About Reading," Educational Research, IX (November, 1966), 60.

[40] John Downing, "Children's Concepts of Language in Learning to Read," Educational Research, XII (February, 1970), 109.

read before they go to school and that they liked to do whatever it was they considered to be reading.[41]

Piaget, although he did not deal directly with the reading process, found that children before the ages of seven or eight had no real social life between each other. Language was used in play, the fundamental activity of the child.[42] After this age, children try to improve upon their methods of interchanging ideas and upon their mutual understanding of one another. However, before this time children are not understanding the communicative properties of oral language, much less having the notion of the communicative aspects of written language.[43]

Vernon found children with reading disabilities may have learned that there is a relationship between spoken and printed words but they do not "seem to understand why; it might be quite an arbitrary association."[44] Even Kenneth Goodman, who does not acknowledge the need for linguistic awareness for beginning readers, indicated that children need to understand the "function of written language," and by so doing would learn to read "easily and painlessly."[45]

Terry Denny and Samuel Weintraub asked first grade children if they wanted to learn to read and why. Approximately a fourth of the children gave no reason or a vague and meaningless response to this

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[41] George E. Mason, "Preschoolers' Concepts of Reading," Reading Teacher, XXI (November, 1967), 131-132.

[42] Piaget, Language and Thought of the Child, p. 40.

[43] Ibid. [44] Vernon, Backwardness in Reading, p. 47.

[45] Goodman, "Manifesto for a Reading Revolution," p. 18.

question. When asked, "What do you have to do to learn how to read in first grade?," 34 percent were either vague or "I don't know" responses. Of the remaining responses, two-fifths indicated passive obedience was necessary to learn to read. Another fifth thought someone else would show them how. Less than two-fifths of these remaining responses (37%) indicated that they would take some action in learning to read.[46]

Older children as well as younger ones seem to have an unclear picture as to what reading is exactly. Even older children regarded as "good" readers seem to have trouble defining reading. Jerry L. Johns compared the concepts of reading given by fourth and fifth grade children reading a year above grade level with those reading a year below grade level. He found that a significantly greater number of meaningful definitions of reading were given by "good" readers as opposed to those regarded as "poor" readers. Meaningful definitions were those other than irrelevant or vague responses, or those that reflected classroom procedures. They included definitions that included word recognition, meaning and understanding or a combination of the two. Even though "good" readers did significantly better than "poor" readers, Johns went on to say that less than half of the good readers gave responses that were judged meaningful.[47] This seems to indicate that even those regarded as better readers do not have a solid concept of just exactly what reading is.

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[46]Terry Denny and Samuel Weintraub, "First Graders' Responses to Three Questions About Reading," Elementary School Journal, LXVI (May, 1966), 446.

[47]Jerry L. Johns, "Concepts of Reading Among Good and Poor Readers," Education, XCV (Fall, 1974), 58-60.

Mary S. Bliss conducted a similar study. She examined children's understanding of the purposes and processes of reading at kindergarten, second, and sixth grade. She also compared good and poor readers at each level. Children were asked questions such as "Why do we read?" and "What does your teacher mean when he/she says someone is a good reader?" Bliss found many vague and erroneous concepts about reading from children throughout the grades. Good readers were more likely to discuss the importance of understanding the material and the readers' active role in the process. Poor readers, on the other hand, more often talked about being taught, therefore taking a more passive role.[48] The difference between the responses of "good" and "poor" readers is of interest in light of the differences in responses Denny and Weintraub found in their previously-mentioned study in terms of passive and active roles in learning to read.

Bliss further found that almost half the children described reading in terms of future relevance. Good readers defined reading more often in terms of comprehension than did poor readers. Poor readers defined it in terms of classroom techniques and test scores more often than did good readers.[49] This finding is in line with what Johns found in the previous study.[50]

Bliss cited her most significant finding as a negative one, in that the category with the smallest number of responses was communication. Communication was not often given as a response to any of the

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[48]Mary S. Bliss, "What Is Reading? Elementary School Children Describe the Purposes and Processes of Reading" (doctoral dissertation, Columbia University, 1978), p. 94.

[49]Ibid. [50]Johns, op. cit.

questions where it might have been appropriate.[51]

The position taken by these researchers is that the understanding of the functions of reading and writing are of crucial importance for success in learning to read. However, they found that many beginning readers do not understand what reading is and that even older children, considered to be good readers, can be confused in this area.

Downing, however, sees the understanding of featural concepts as being equally as important as functional concepts.[52] The research that follows examines the featural concepts involved in linguistic awareness.

Research About Featural Concepts

Knowledge about featural concepts means understanding the technical linguistic concepts needed for reasoning about the relationship between speech and writing. It is the language available to children for talking and thinking about the reading task. According to Downing, these technical concepts of language are initially unknown to the child but must be understood if the child is to benefit from reading instruction.[53]

Two lines of research have been conducted to discover what young children know about the featural concepts of language involved in reading. There are those attempting to discover how children perceive word boundaries and segments in speech. Others are looking at how children interpret and use reading instruction terminology such as word,

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[51]Bliss, op. cit., p. 96.

[52]Downing, Reading and Reasoning, p. 12.

[53]John Downing, "Words, Words, Words," Theory into Practice, XVI (December, 1977), 330.

sound, letter and number. These are the technical terms used in the language of instruction. Although several researchers have combined these two areas in their research, they will be discussed in separate sub-sections.

Word boundaries. Indications are that perceptions of speech and print segments of young children beginning reading instruction do not match with the units, word and phoneme, as understood by adults either in speech or print. Downing and Oliver found in their study with upper and middle class children that up until the age of eight years old, children were confusing both isolated phonemes and syllables with words. And, up until the age of six and a half they were confusing nonverbal sounds with words.[54]

The majority of the studies that attempted to discover children's ability to segment words had the children tapping with chips or moving blocks to indicate where words began and ended. Readers appeared to be more accurate than nonreaders and those children who segmented more accurately at the beginning of the year tended to be better readers at the end of the year.

Holden and MacGinitie tested children nearing the end of kindergarten and found that only a few children could segment both speech and print conventionally. Even children who, after brief instruction, recognized that the spaces between the words represented boundaries still tended to divide utterances into units that did not correspond to

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[54]John Downing and Peter Oliver, "The Child's Conception of a Word," Reading Research Quarterly, IX (Fall, 1973-74), 580.

traditional printed words.[55] Linnea C. Ehri, using the same chip-tapping technique as Holden and MacGinitie, had children mark word and syllable units in sentences by tapping and by laying down chips. Comparisons revealed that readers were more successful at analyzing sentences into words and syllables than either preschoolers or kindergartners, and the latter two groups did not differ.[56]

Evans, Taylor and Blum, using a similar task, aural word boundaries, had beginning first grade children move a small wooden block for each word while repeating a sentence. Abilities on the aural word boundaries task, along with the visual word boundaries task, the mow-motorcycle task, the picture sentence length task, the aural consonant close and the metalinguistic interview in their Written Language Awareness Battery were found to have statistically significant coefficients of correlations with reading comprehension subtest scores at the end of the year on the Metropolitan Achievement Test. And, five out of the seven tasks showed statistically significant coefficients of correlation with the total scores on the Metropolitan Readiness Test. The children who had better mastery of linguistic awareness as measured at the beginning of the year were better readers at the end of the year.[57]

The only study found in disagreement with those previously mentioned was done by Ellen B. Ryan, Stephen R. McNamara, and Margaret

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[55]M. Holden and W. MacGinitie, "Children's Conception of Word Boundaries in Speech and Print," Journal of Educational Psychology, LXIII (December, 1972), 551-57.

[56]Linnea C. Ehri, "Word Consciousness in Readers and Prereaders," Journal of Educational Psychology, LVII (April, 1975), 204-212.

[57]Evans, Taylor, and Blum, op. cit., pp. 16-17.

Kenney. They administered five linguistic awareness tasks and found performance on all the tasks except word tapping to show a substantial advantage for better readers over poorer readers. They found these results with first and second grade readers to be similar to those of older remedial readers. The lack of significance on the word-tapping task in relation to reading achievement is in conflict with earlier studies with young children.[58]

Related studies dealing with word boundaries tried to determine if children understood the fact that words that took longer to say were represented by longer print representation. Paul Rozin and others developed an objective test, called the Mow-Motorcycle Test, to determine if children understood that longer written words generally take longer to say. They found that most inner city kindergartners did not perform well on this test. A majority of suburban kindergartners and inner city first and second graders performed well; but many did not. Forty-three percent of the urban second graders failed to meet the criterion. There was a significant difference between the scores of urban and suburban kindergartners.[59]

Evans, Taylor and Blum[60] used the same Mow-Motorcycle Test designed by Paul Rozin, Beth Bressman, and Mark Taft as part of their

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[58]E. B. Ryan, S. R. McNamara and M. Kenney, "Linguistic Awareness and Reading Performance Among Beginning Readers," Journal of Reading Behavior, IX (Winter, 1977), 400.

[59]Paul Rozin, Beth Bressman and Mark Taft, "Do Children Understand the Basic Relationship Between Speech and Writing? The Mow-Motorcycle Test," Journal of Reading Behavior, VI (September, 1974), 327-334.

[60]Evans, Taylor and Blum, loc. cit.

previously mentioned Written Language Awareness Battery. This test was designed to discover if children could identify the printed word that corresponds in length with a spoken word. Children were presented with eight cards containing pairs of printed words beginning with the same letter. One word was long, the other short. The child was asked to identify one of the words by pointing. They found it to be significantly correlated with reading comprehension test scores on the Metropolitan Achievement Test at the end of the first grade. I. Lundberg and M. Torneus expanded upon the Mow-Motorcycle Test developed by Rozin, Bressman and Taft. They tested 100 nonreading children from nursery schools in Sweden. The children ranged in age from 3.9 to 6.7. The majority of the youngest children's choices of written words when given the target word orally showed that they did not see the connection between the length of the spoken word and the length of the written word. Five-year-olds began to explain their choices although they were often incorrect. By six years old, the explanations were beginning to reflect their semantic strategy. And, some of the oldest children showed that they recognized the relationship between spoken and written words and grasped the relationship between semantic and graphic length. But, they went on to say that "there is considerable risk that conventional beginning reading instruction with phonic emphasis starts well before the children have developed necessary metalinguistic skills."[61]

Nancy S. Meltzer and Robert Herse, working with 39 first graders, found children after two and a half months in first grade to be at

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[61] I. Lundberg and M. Torneus, "Nonreaders' Awareness of the Basic Relationship Between Spoken and Written Words," Journal of Experimental Child Psychology, XXV (June, 1978), 411-412.

varying levels along what they believe to be a sequence in the development of the concept of a written word. They found children eliminating a variety of cues before coming to the conclusion that space was the determining factor in word boundaries. They also looked at the 13 poorest second grade readers and found that six of them were still dividing long words at an ascending or descending letter.[62]

Johns found that children in all three age groups he studied from 5.6 to 9.5 tended to exclude long words from their concept of a spoken word.[63] Likewise, Downing and Oliver found a tendency for the children between 5.6 and 6.5 to exclude long words from their concept of a spoken word. Downing and Oliver speculated that the children in this age group had just begun formal reading instruction and were being exposed to only short words and perhaps they were making the association on this basis.[64]

Evans, Taylor and Blum used the same word boundary task as Meltzer and Herse. They gave the children printed sentences and asked them to circle each word. This task was one of the five in the Written Language Awareness Battery found to be significantly correlated with reading achievement at the end of the first grade.[65]

Marie M. Clay found that, when word orientations were changed from normal to reversed and inverted, the cues good readers used to

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[62]Nancy S. Meltzer and Robert Herse, "The Boundaries of Written Words as Seen by First Graders," Journal of Reading Behavior, I (Summer, 1969), 8-9.

[63]Jerry L. Johns, "Children's Conceptions of a Spoken Word: A Developmental Study," Reading World, XVI (May, 1977), 255.

[64]Downing and Oliver, op. cit., 580-581.

[65]Evans, Taylor, and Blum, op. cit., 16-17.

identify words were more disrupted than those of poor readers who showed little concern. Children were tested during the first three years of reading instruction. The lowest 35 percent of the children in reading ability appeared to be paying less attention to the patterns and features in print conventions throughout their first year of reading instruction.[66]

Investigating similar concepts, Julian Hochberg and others filled in the spaces between words in a story with meaningless symbols. When they compared the slowest and fastest first grade readers they found that the pace of the slowest readers was little changed by the filled-in spaces. However, the better readers slowed significantly, indicating superior knowledge about orthographic and syntactic structures.[67]

Print concepts. Within the concept of word boundaries, the last few studies in the previous section were, at the same time, dealing with children's understanding of printed language. Other studies are showing that in addition to understanding featural concepts necessary to discriminate word boundaries, children must also deal with technical terms such as word, sound, letter, and number in the language of reading instruction.

One of the first studies done to discover young children's conceptual understanding of the language of reading instruction (a study

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[66]Marie M. Clay, "An Increasing Effect of Disorientation on the Discrimination of Print: A developmental Study," Journal of Experimental Child Psychology, IX (June, 1970), 304-305.

[67]Julian Hochberg, "Components of Literacy Speculations and Exploratory Research," Basic Studies on Reading, eds. Harry Levin and Joanna P. Williams (New York: Basic Books, 1970), pp. 87-88.

mentioned previously) was the work done by J. F. Reid and published in the article, "Learning to Think About Reading." Reid reported the results of interviewing five-year-old children three times during their first year of schooling about the "technical vocabulary" of reading instruction. Reid called this the language available for talking and thinking about reading.[68] The results of Reid's work indicated that at the beginning of their school career, the children she interviewed had little awareness of what the reading task consisted of. They further were less aware that "written words were composed of letters which stood for sounds."[69] By the second and third interview, Reid found that although progress was slow in acquiring the correct terminology, the more vocabulary the children had to help them make distinctions between the terms and the concepts, the more successful they were at grasping the differences between words, sounds, letters, and numbers.[70]

Several studies have followed Reid's interview procedures with similar results. Downing's 1970 study replicated the interview procedure and, in addition to the interview, Downing provided concrete stimuli which included pictures, books, and objects with writing on or depicted in them. With the concrete stimuli, Downing found that children were better able to show their understanding of the technical concepts of language. However, these school beginners still had difficulty understanding the abstract terminology.[71] The conclusions drawn in this

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[68]J. F. Reid, "Learning to Think About Reading," Educational Research, IX (November, 1966), 56.

[69]Ibid., 61. [70]Ibid.

[71]John Downing, "Children's Concepts of Language in Learning to Read," Educational Research, XII (February, 1970), 106-112.

study were strengthened by a follow-up study by Downing and Peter Oliver which included an improved research design and a larger sample of children. The children were chosen from three age levels: 4.5 to 5.5 years, 5.6 to 6.5 years, and 6.6 to 8.0 years. The results of this study suggested further that even up until 8 years old children were confusing isolated phonemes and syllables with words.[72] And, it added further credence to the results of Reid's study and Downing's earlier study that beginning readers and their teachers do not have the same concept when talking about "words."

Johns replicated, and generally confirmed, the Downing and Oliver finding that young children do not appear to possess an adequate concept of what constitutes a spoken word, especially in the early stages of reading instruction. His study consisted of 120 American children selected from three age ranges: 5.6 to 6.5, 6.6 to 8.0 and 8.1 to 9.5 years. The last age range was older than the oldest children in the Downing and Oliver study to provide additional data. He found, for the most part, that the findings of the Downing and Oliver study were supported. By the time children were in second and third grade (8.1 to 9.5 years of age) their concept of a word was generally good except for confusing isolated phonemes and syllables as words. Almost 40 percent of beginning readers failed to consistently recognize a spoken word as a word. Although Johns found that the situation improved by the time the children reached second or third grade, an occasional child was still identifying the sound of a dog barking or "mother and father" as a word. A larger number of children were uncertain as to whether a phoneme and a

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[72]Downing and Oliver, op. cit., p. 581.

syllable was or was not a spoken word.[73]

Evans, Taylor and Blum also used an interview technique as part of their Written Language Awareness Battery. The questions in their "metalinguistic interview" were designed to discover children's understanding of the language of instruction. Children were asked to find a single letter, word, and sentence on a page. In addition, the children were given a book and asked to demonstrate how to begin reading it. Of the seven tasks in their battery, the metalinguistic interview was found to be the best predictor of reading scores.[74]

Hazel Francis also confirmed Reid's and Downing's findings that children are confused about the concepts of letter and word. She attempted to trace chilren's comprehension of instructional terms and determine if children understood the following concepts: letter, word, and sentence. The children in Francis' study were asked to say a letter, word, and sentence and tell their use. They were also shown cards and asked to identify examples of each. She commented that "it was as though the children had never thought to analyze speech, but in learning to read had been forced to recognize units and subdivisions."[75] She found that children learned the concept "letter" before "word," and "word" before "sentence." She found that the concept of word and sentence were mastered while children were already reading. In her

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[73]Jerry L. Johns, "Children's Conceptions of a Spoken Word: A Developmental Study," Reading World, XVI (May, 1977), 248-257.

[74]Evans, Taylor and Blum, op. cit., p. 17.

[75]Hazel Francis, "Children's Experience of Reading and Notions of Units in Language," British Journal of Educational Psychology, XLIII (February, 1973), 22.

summary she noted that the children's "notions of units in language appear to be derived from analysis of written forms as they learn to read."[76] She disagreed with Downing slightly by saying that perhaps the confusion was not so much caused by the abstractness of the concepts but that they "overlap in their application and are somewhat ill-defined."[77]

Concepts About Print (Sand) Test

Since the Concepts About Print (Sand) Test was one of the test instruments used in this study, research using this test has been summarized here separately.

Marie M. Clay developed the Concepts About Print (Sand) Test to test children's knowledge about significant concepts about printed language. The Concepts About Print (Sand) Test reflects children's knowledge of print format, word order, letter order, punctuation and word boundaries. Clay's rationale for developing the test was that she felt that before children can attach a sound to a letter symbol, they need to see the letter symbol as a separate entity, different from other symbols.[78] She felt this had been overlooked too long in the beginning reading process. Clay indicated that changes in reading skills measured by the Sand will be noted during the first year of instruction but for children making average progress it is less significant in the following years. But, for problem readers, "confusions about these arbitrary

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[76]Ibid., p. 23. [77]Ibid., p. 22.

[78]Marie M. Clay, Reading: The Patterning of Complex Behavior (London: Heinemann Educational Press, 1972), p. 137.

conventions of our written language code tend to persist.[79]

In her validity and reliability studies, Clay tested 320 urban children ranging in age from 5.0 to 7.0. She found a correlation with word reading for 100 children at 6.0 to be .79. A reliability figure of .95 was based on 40 urban children aged 5.0 to 7.0 who took the test in 1967.

Kaaren Day and H. D. Day gave the Sand test to 56 kindergartners three times during their kindergarten year. Fifty-one of the 56 children returned the following year to first grade and were again given the Sand at the beginning of first grade along with the Metropolitan Readiness Test. They found through multiple and partial correlational analysis that the "sound-letter correspondence," "visual matching," and the "finding patterns" subtests of the Metropolitan Readiness Test and the Sand measured similar abilities.[80] Day and Day suggested that if all the print concepts found in the Sand are necessary for reading success, then, based on their study, many first graders do not have these concepts at the beginning of first grade. This conclusion was based on the fact that the average kindergartner obtained a score of less than half (10.8) when tested at the end of kindergarten. The mean score for the Sand given at the beginning of first grade was 13.0 which was significantly higher than the end-of-kindergarten score. The authors considered this still small based on the total possible score of 24.

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[79]Marie M. Clay, The Early Detection of Reading Difficulties: A Diagnostic Survey (Exeter, New Hampshire: Heinemann Educational Books, 1972), p. 10.

[80]Kaaren C. Day and H. D. Day, Observations of Kindergarten and First Grade Children's Development of Oral Language, Concepts About Print, and Reading Readiness, U.S., Educational Resources Information Center, ERIC Document ED 176 212, 1978.

They found the Sand, for all four administrations, to be positively correlated with all subtests of the Metropolitan Readiness Test. The authors felt that the high correlation between the last administration of the Sand with the MRT indicated that "the Sand may be useful in verifying and elaborating the readiness or lack of readiness revealed by the MRT in the first grade."[81]

Jerry L. Johns designed a study to compare above average, average, and below average readers' concepts about print as measured by the Sand at the end of the first year of formal reading instruction. The purpose was to determine if children with various reading abilities would differ in their Sand scores and also to provide additional reliability data for the Sand.

His results revealed a significant difference between the means at the .05 level for each of the three groups. No significant difference was found between the means of males and females. Above average readers' concepts about print were significantly higher than those for average and below-average readers. The total scores for average readers were also significantly higher than those for below-average readers. Correlation coefficients of .86 for males, .76 for females and .82 for the total sample resulted when the Kuder-Richardson Formula No. 20 was applied to an odd-even split of items on the Sand.[82]

Johns indicated that his findings offer additional support for the growing number of research studies which have sought to link the

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[81]Ibid.

[82]Jerry L. Johns, "First Graders' Concepts About Print," Reading Research Quarterly, XV (Fall, 1980), 529-549.

"cognitive clarity" theory and reading achievement.[83]

Technical Language of Literacy (TLL)

The "Technical Language of Literacy" subtest was originally part of an experimental battery designed by Peter Evanechko and others. The purpose of the original battery was to measure the level of reading readiness of school beginners by looking at the nonperceptual components involved in the reading task.[84] The concepts tested in the "Technical Language of Literacy" subtest remained the same for both the original and revised version of the test. The "Technical Language of Literacy" subtest is now one of three in the Linguistic Awareness Reading Readiness Test developed recently by John Downing, Douglas Ayers, and Brian Schaefer. The subtest was designed to test children's knowledge of technical terms used in the language of instruction, such as "letter," "word," and "number."

Research involving the "Technical Language of Literacy" (TLL) subtest is summarized here separately as it was also used in this study along with the Concepts About Print (Sand) Test to investigate children's linguistic awareness. The Linguistic Awareness Reading Readiness Test (LARR) was recently published in late 1980. Therefore, research using it is limited to research by the authors.

Downing and Ayers tested kindergartners in late May and early June and found that the third subtest, "Technical Language of Literacy,"

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[83]Ibid., p. 547.

[84]Peter Evanechko, Lloyd Ollila, John Downing, and Carol Braun, "An Investigation of the Reading Readiness Domain," Research in the Teaching of English, VII (Spring, 1973), 62.

was the best predictor of reading achievement a year later. They went on to say that there was certainly sufficient information provided to indicate that test 3, TLL, is a "useful predictor of reading achievement in grade 1 as measured by the part and total scores of the Cooperative Primary Reading Test."[85]

Downing, Ollila, and Oliver used the three subtests of the LARR test as part of a battery of tests designed to measure "specific cognitive or non-perceptual components of reading skills" of kindergartners from various socioeconomic levels. They found that differences between socioeconomic levels largely occurred at initial October testing but not at retesting. At the May retesting, the only statistically significant difference was on the "Technical Language of Literacy" subtest where children from high socioeconomic schools scored higher than children in either middle or low socioeconomic schools.[86]

The correlations between the LARR test and more conventional indicators of reading readiness--"Visual Letter Recognition/Letter-Name Knowledge," "Visual Word Matching," and "Initial Phonemes"--were moderate for the first two subtests of the LARR test but were high for the "Technical Language of Literacy" subtest. There was a general improvement in scores on the conceptual tests from the initial October testing to retesting after the kindergarten experience.[87]

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[85]Douglas Ayers and John Downing, "Children's Linguistic Awareness and Reading Achievement" (unpublished paper), University of Victoria, 1980, p. 8.

[86]John Downing, Lloyd Ollila, and Peter Oliver, "Concepts of Language in Children from Differing Socio-Economic Backgrounds," Journal of Educational Research, LXX (May/June, 1977), 279.

[87]Ibid., p. 280.

Summary

There are two main categories within the reading task about which children seem to need understanding in order to learn to read successfully. They need to know why we have written language and how it operates. Research done in these two areas, the functional and featural concepts of literacy, has been reviewed. Beginning with Reid's article, "Learning to Think About Reading," researchers have pointed out that beginning readers are often confused and do not have a clear understanding of functional and featural concepts involved in reading instruction. Children beginning reading instruction do not seem to be making the connection between oral and written language. They have difficulty understanding the purpose of written language and have little knowledge of the technical terminology used in reading instruction.

Reid, in her early study, found it a matter of conjecture as to how much help to children's learning it would be to consciously and carefully develop awareness of reading terminology, but she expressed the view that it might well make a difference to their reading and to their general logical thinking as well.[88] More recent researchers seem to be in agreement with Reid, indicating that linguistic awareness plays an important role in beginning reading instruction. As Downing pointed out, "we tend to assume that certain concepts of language are self-evident and therefore we believe that we do not need to help children to understand them."[89] However, the findings presented thus far lead to

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[88]Reid, op. cit., p. 62.

[89]John Downing, "Words, Words, Words," Theory into Practice, XVI (December, 1977), 328-329.

questioning children's understanding of reading terminology. Downing gave teachers the task of discovering the unknowns about language and reading which have to be overcome if the nonreader is to understand our reading instruction.[90] Likewise, MacGinitie and Holden advise that we can not take it for granted that children will understand the first grade teacher when words and their printed representations are discussed.[91]

In Johns' view, linguistic awareness has important ramifications for reading instruction, and he found that students who did not understand these concepts may have reading difficulties.[92] His research led him to conclude that 10 to 25 percent of the children classified as disabled readers remain cognitively confused so long that the "reading process becomes short-circuited."[93] He further said that helping students attend to differences between reading terminology, such as letter, word, and sound, may help them learn to "focus attention on the appropriate aspects of the learning task."[94]

The conclusion drawn by Evans, Taylor and Blum indicated that "understanding the nature of written language must be acquired in learning to read." They went on to say that this understanding "may be a

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[90]Ibid.

[91]Marjorie H. Holden and Walter H. MacGinitie, "Children's Conceptions of Word Boundaries in Speech and Print," Journal of Educational Psychology, LVIII (December, 1972), 556.

[92]Jerry L. Johns, "First Graders' Concepts About Print," Reading Research Quarterly, XV (Fall, 1980), 531.

[93]Jerry L. Johns, "Children's Conceptions of a Spoken Word: A Developmental Study," Reading World, XVI (May, 1977), 256.

[94]Johns, "First Graders' Concepts," p. 547.

major source of difficulty for some children."[95]

The consensus of the researchers delving into the linguistic awareness of beginning readers is perhaps summed up best by Downing in his latest book, Reading and Reasoning:

> There are indications from a wide range of investigations that beginners are confused about the communication process and about featural concepts used in reading instruction. Also, there is indirect evidence that this confusion is an important factor in success or failure in learning to read.[96]

Piagetian Theory and Reading

Piaget's developmental theory of how children learn and grow intellectually is based on the premise that children's thinking differs from that of adults. We can be misled into believing that children understand more than they do. Children view the world differently than adults and are not miniature adults in their thinking. Mental development, according to Piaget, occurs through a definite set of stages which happen in a fixed sequence. The stages refer to differences in the structure of thinking. They are not merely due to increased knowledge. These changes in structure are brought on by individuals' adaptation to their environment through the two opposing functions of assimilation and accommodation. Piaget called the balance between the two "equilibration." One of Piaget's central theses was that "only through tension and conflict of imbalanced assimilation and accommodation does intellectual growth occur."[97]

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[95] Evans, Taylor and Blum, op. cit., p. 16.

[96] Downing, Reading and Reasoning, pp. 20-21.

[97] Cowan, Piaget with Feeling, p. 24.

Assimilation, in the Piagetian model, has been defined as "the filtering or modification of the input."[98] Philip Cowan clarified this definition by saying that assimilation is a process in which additional elements (stimuli or behaviors) are taken into existing structures. However, Cowan was quick to point out that the new stimulus does not enter in an "as is" condition. The existing cognitive structure has some effect on it and some aspects are always transformed by this existing cognitive organization.[99]

Accommodation, on the other hand, is the "modification of internal schemes to fit reality."[100] The individual's cognitive structure is modified by feedback from observations and experiences. Existing structures are transformed in the process of attempting to transform and incorporate new information.[101]

The developmental process, according to Piaget, depends upon an interaction between children's experiences and their level of cognitive development. Therefore, the age and rate at which individual children reach each Piagetian stage may differ. Two of these stages are of particular importance for children during beginning reading instruction: preoperational thought and the concrete operational stage. It is during the transitional period between these two stages that children generally first come in contact with formal reading instruction. An overview

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[98]Jean Piaget and Barbel Inhelder, The Psychology of the Child (New York: Basic Books, 1969), p. 6.

[99]Cowan, op. cit., pp. 21-22.

[100]Piaget and Inhelder, loc. cit.

[101]Cowan, op. cit., p. 23.

follows of the Piagetian conception of children's thinking during these two stages.

Preoperational Thought

Preoperational thought is characterized by being static and immobile. Children's perceptions and interpretations of the world are tinted by their personal preconceptions.[102] Piaget found several reasons for this. The child's thinking at this level is very egocentric. The child is unable to take the role of another.[103] John H. Flavell further indicated that the child is not able to identify thought as a process. A child "thinks but he cannot think about his own thinking."[104] He can not separate thoughts from his concept of self and therefore has difficulty taking another's viewpoint. All his thinking is done in terms of himself.[105] The child has difficulty understanding others accurately.[106] Elkind saw egocentrism playing a role in the preoperational child's inability to clearly differentiate between "symbols and referents."[107] Egocentric preoperational children are tuned into themselves. Symbols outside their world would be of little interest.

Another pronounced characteristic of preoperational children, related to their egocentric nature, is that there is a tendency for them

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[102]John H. Flavell, The Developmental Psychology of Jean Piaget (Princeton, New Jersey: D. Van Nostrand, 1962), p. 157.

[103]Ibid., p. 156. [104]Ibid.

[105]Piaget, Language and Thought of the Child, p. 119.

[106]C. M. Charles, Teachers' Petit Piaget (Belmont, California: Fearon-Pitman, 1974), p. 7.

[107]David Elkind, Children and Adolescents (New York: Oxford University Press, 1974), p. 76.

to center. Children's attention is drawn to one feature of an object, symbol or event.[108] They are unable to think of several aspects of a situation at once. By singling out one aspect to attend to and neglecting other important aspects, children's views are distorted.[109] Instead of objective adaptation to reality, the reality is assimilated into children's current cognitive structure.[110]

The preoperational child is unable to recognize that thought is reversible. Thinking during this period is not mobile and flexible enough to allow children to retrace their steps back to their original premise. More than likely, the original premise has been altered and changed during the reasoning process. The child does not recognize that changes in position, shape, and order can be returned to the original position. Flavell saw this as indicative of an imbalance between assimilation and accommodation.[111] The child's cognitive organization does not hold together in the process of accommodating to a new situation.

Preoperational thinkers are unable to deal with transformations. Their attention tends to focus on the successive states or configurations rather than on how one state is transformed into another. Children at this stage can not link conditions into an integrated whole. They are concerned more with the static or fixed character of things.[112] Still being unable to see parts and at the same time relating these

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[108] Flavell, op. cit., p. 157. [109] Ibid.

[110] Jean Piaget, Play, Dreams and Imitation in Childhood (New York: W. W. Norton, 1951), p. 285.

[111] Flavell, op. cit., p. 153. [112] Ibid., p. 157.

parts to the whole makes dealing with the whole integrated process of a change from one state to another impossible.[113]

Perhaps the most important missing element during this period, according to Piaget,[114] is that children at the preoperational level lack operations. Specifically, he said "there is as yet no conservation which is the psychological criterion of the presence of reversible operations." He went on to say the inability to grasp the notion of conservation, until the age of seven, is the "clearest indication of the existence of a preoperatory period."[115]

As children move through the late preoperational years (4-7), there is a gradual transition into the period of concrete operations (7-11). The next section describes how children's thinking changes with respect to the above characteristics when they move into the stage of concrete operations.

Concrete Operations

On the average, according to Piaget, children begin to move from the stage of preoperational thought into the stage of concrete operations between the ages of seven and eight years of age.[116] How does the transition to concrete operations change children's thinking? Flavell found children functioning at the concrete operational stage as

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[113]Henry W. Maier, Three Theories of Child Development (New York: Harper and Row, 1965), p. 116.

[114]Jean Piaget, "Development and Learning," Readings in Learning and Human Abilities, ed. Richard E. Ripple (Harper and Row, 1971), p. 186.

[115]Piaget and Inhelder, op. cit., p. 97.

[116]Piaget, Language and Thought of the Child, pp. 49, 74, 120.

capable of "a wide variety of tasks as though a rich and integrated assimilatory organization were functioning in equilibrium or balanced with a finely tuned, discriminative, accommodatory mechanism."[117] The rigid, immobile, and irreversible structures typical of preoperational thought become more flexible, mobile, decentered, and reversible.[118] Children functioning at the concrete operations level differ from preoperational thinkers in three major areas: centration vs. decentration, static vs. dynamic thought, and irreversibility vs. reversibility.

Operational thought has been referred to by Maier as the mental capacity to "order and relate experiences to an organized whole."[119] Children will be increasingly able to organize experiences, make and conserve classifications and arrangements, and view events from different perspectives.[120] However, children during this stage will, as yet, not be able to perform mental operations unless they can perceive their logic concretely.[121] The next transition to formal operations allows the child to be able to think totally in the abstract.

At the concrete operational level, children acquire new organizational skills. Because of decreasing egocentrism, they can see an event from different perspectives. They can consider several points of view simultaneously without adopting any particular one since they are now able to return their thinking to the original starting position. The ability to decenter gives children the ability to coordinate and

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[117] Flavell, op. cit., p. 165. [118] Ibid., p. 163.

[119] Ibid., p. 125. [120] Charles, op. cit., p. 15.

[121] Maier, op. cit., p. 126.

take into account several dimensions of a situation at one time.[122]

The increased understanding of reversibility and reciprocity gives children insight into transformations. In addition to being able to deal with static and immobile states, children become capable of dealing with the dynamic and transformative nature of things. They are interested in the transformations between one state and another and are able to deal with the total structure of interrelated parts and see an event or thought from beginning to end. They realize that transformations can be undone mentally to see the return to the original situation.[123]

Perhaps the most significant change--as a result of decreases in egocentrism, the increased ability to decenter, and the recognition of reversibility--is that children begin to be able to deal with parts within wholes and deal with them within a hierarchical system. As a result, they can deal with more complex relationships, "not only taking into account the immediate situation but mentally making comparisons and exploring the similarities and differences in previous experiences."[124]

Children at this concrete operational level will, according to those applying Piagetian theory to the elementary curriculum, learn to read more easily. They are better equipped to deal with the abstractness of the reading process. To determine whether children are concrete or

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[122]T. Gary Waller, Think First, Read Later! (Newark, Delaware: International Reading Association, 1977), p. 5.

[123]Ibid.

[124]M. Almy, E. Chittenden, and P. Miller, Young Children's Thinking (New York: Teachers College Press, 1967), p. 13.

preoperational thinkers, many researchers have investigated children's abilities to conserve.

Role of Conservation in Reading

Piaget, not being an educator, did not address educational problems such as reading achievement. However, followers of Piaget have attempted to discover if in fact the transition from the preoperational stage to the concrete operational stage is necessary for successful reading achievement and also to see if children considered to be "good" readers are functioning at higher cognitive levels than children labeled as "poor" readers. Many of these studies have looked into these areas by investigating children's understanding of conservation. In Piagetian theory, conservation has been defined as the understanding that constructs such as weight or quantity remain the same in spite of transformations such as displacement, changing shape or sectioning into pieces.[125] Conservation tasks have been the most frequently investigated of the Piagetian tasks. It represents a pivotal construct in children's cognitive transition from the preoperational stage to concrete operations.

The abundance of conservation studies is perhaps due to Piaget's statement that the lack of conservation is the "clearest indication of the existence of a preoperatory period."[126] And, perhaps it is in part due to the ease of testing conservation skills and the development of a

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[125]Gil Gaudia, "Race, Social Class, and Age of Achievement of Conservation on Piaget's Tasks," Developmental Psychology, VI (January, 1972), 158.

[126]Piaget and Inhelder, op. cit., p. 97.

conservation test instrument, the Concept Assessment Kit--Conservation by Marcel L. Goldschmid and Peter M. Bentler, which has standardized testing procedures.

Conservation problems are thought to show which children have reached a new level of cognitive functioning. Children who are able to conserve must be able to discriminate between "how things look and how they really are."[127] In the following section, research is reviewed that looks at the relationship between conservation and reading achievement. Those studies using the Concept Assessment Kit--Conservation were of particular interest since findings using this standardized instrument were more comparable.

Research Studies

Although there have been numerous studies concerned with either cognitive development or reading, there have not been an abundance of studies relating Piaget's levels of cognitive development to successful reading achievement. Generally, the investigations of the relationship between reading or reading readiness and cognitive development according to Piaget have been conservation studies. T. Gary Waller credits the prevalence of conservation studies to the professional interest in conservation, along with the availability of standardized test materials, the Concept Assessment Kit--Conservation.[128]

Waller reviewed the literature investigating the relationship between reading or reading readiness and performance on Piagetian

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[127] David Elkind and John H. Flavell, Studies in Cognitive Development: Essays in Honor of Jean Piaget (New York: Oxford University Press, 1969), p. 177.

[128] Waller, op. cit., p. 11.

cognitive tasks. He found that there was "at least a low positive correlation between performance on a variety of tests of reading and reading readiness on the one hand and measures of level of cognitive development as regards concrete operations (specifically conservation) on the other."[129] Alyce P. Jewell also noted that in most studies based on Piagetian theory a significant but moderate link between reading readiness or reading achievement and scores on Piagetian tasks were reported.[130]

The following researchers have investigated the possible relationship between reading readiness or reading achievement and the ability to conserve. Particular note was made of studies which used the Concept Assessment Kit--Conservation (CAK-C) since it has been the only standardized instrument thus far developed in an attempt to measure conservation abilities. Other researchers have set up Piagetian tasks to replicate those of Piaget and his followers, but as yet those have not been standardized.

Marcel L. Goldschmid began his preliminary work toward the development of the Concept Assessment Kit--Conservation (CAK-C) by designing ten experiments modeled after Piaget's tasks to measure conservation levels.[131] In its final form, the CAK-C published by Goldschmid and Peter M. Bentler includes six tasks. Goldschmid and

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[129] Ibid.

[130] Alyce P. Jewell, "Metalinguistic Awareness and Conservation: Their Relationship, Development, and Use as Predictors of Reading Achievement" (doctoral dissertation, University of Maryland, 1978), p. 86.

[131] Marcel L. Goldschmid, "Different Types of Conservation and Nonconservation and Their Relation to Age, Sex, IQ, MA, and Vocabulary," Child Development, XXXVIII (December, 1967), 1229-1246.

Bentler, along with several other researchers, have found significant correlations between conservation and reading-related activities for first and second graders using the CAK-C. In particular, Goldschmid and Bentler found significant correlations between conservation and growth in vocabulary, oral expression, and written expression,[132] and Ayers, Rohr, and Ayers extended these findings to include kindergartners.

Carol S. Beers administered the CAK-C to 116 second graders. She found a moderately significant relationship between concept attainment and reading vocabulary ($r = .38$) and comprehension ($r = .33$) as measured by the Gates-MacGinitie Reading Test. IQ was found not to be correlated significantly with the total conservation score ($r = .10$).[133]

Ayers, Rohr and Ayers, using conservation tasks similar to the CAK-C, tested 94 kindergartners and first graders as to their school readiness as measured by the Metropolitan Readiness Test. In their study, conservation was determined by six Piagetian conservation tasks including number, liquid amount, solid amount, weight, length and area. They found a significant moderate correlation between the Piagetian tasks and the "Listening" and "Numbers" subtests and also with total score on the MRT, indicating a moderate correlation between school readiness and logical thinking on conservation tasks.[134]

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[132]Marcel L. Goldschmid and Peter M. Bentler, "The Dimensions and Measurement of Conservation," Child Development, XXIX (September, 1968), 797.

[133]Carol Strickland Beers, "The Relationship of Conservation Attainment to Reading Performance in Second Graders" (doctoral dissertation, University of Virginia, 1976), pp. 41-43.

[134]Jerry B. Ayers, Michael E. Rohr, and Mary N. Ayers, "Perceptual and Motor Skills, Ability to Conserve, and School Readiness," Perceptual and Motor Skills, XXXVIII (April, 1974), 493-494.

Beverly W. Brekke, John D. Williams, and Steven D. Harlow found that conservation was positively and moderately correlated with reading readiness. It was only slightly less correlated with reading readiness than intelligence. They indicated that conservation and intelligence were two different constructs since they found only a moderate relationship ($r = .38$) between conservation and intelligence.[135]

However, R. DeVries' findings were somewhat in conflict with the previous studies. She found no overlap between knowledge on Piaget-type tasks and school achievement, knowledge as measured by the Metropolitan Achievement Test. There was evidence to indicate a moderate degree of overlap between intelligence as defined by the Stanford-Binet mental age and the Piagetian tasks, but they were not the same.[136]

The question of the predictive value of conservation tasks has occupied several researchers. The value of conservation tasks for use as readiness instruments and predictors of later reading achievement for beginning readers has yet to be determined. The following studies seem to indicate that Piagetian tasks have some predictive characteristics but as yet have not proven themselves to be better predictors of first grade reading achievement than several reading readiness tests now being used.

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[135]Beverly W. Brekke, John D. Williams, and Steven B. Harlow, "Conservation and Reading Readiness," Journal of Genetic Psychology, CXXIII (September, 1973), 136-137.

[136]R. DeVries, "Relationships Among Piagetian, IQ, and Achievement Assessments," Child Development, XLV (September, 1974), 751.

Millie Almy, Edward Chittenden, and Paula Miller found that, in general, children who were able to conserve at an early age did better on other tests related to mental abilities and to beginning reading and arithmetic. They found that children who performed well on conservation tasks also did well on beginning reading. They found the advantage greater in kindergarten and first grade than later when conservation ability became more universal.[137]

A study by Brekke and Williams also tried to determine the predictability of conservation. First grade children were given reading readiness, intelligence, and conservation testing early in the year. Seven months later they were given a reading achievement test. Although both conservation and intelligence were significant predictors of two measures on the reading test, vocabulary and comprehension, neither was significant as a predictor when a reading readiness test was included in the initial test battery. Since none of the partial correlations was significant, it indicated that the relationship between conservation and reading achievement was not independent of reading readiness or IQ.[138]

Another study by Alan S. Kaufman and Nadeen L. Kaufman also tried to determine the predictability of Piagetian tasks. During kindergarten, children were tested on the Gesell School Readiness Test, Lorge-Thorndike Intelligence Test and a 13-task battery of Piagetian tasks. The Stanford Achievement Test was then given at the end of first grade. The Piagetian tasks correlated .64 with the composite score on

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[137]Almy, Chittenden, and Miller, op. cit., p. 71.

[138]Beverly W. Brekke and John D. Williams, "Conservation as a Predictor of Reading Achievement," Perceptual and Motor Skills, XL (February, 1975), 97-98.

the SAT and .58 with the reading subtest. However, of the three predictor tests, the Gesell School Readiness Test correlated best with reading at .63.[139]

Comparative studies have been designed to compare early readers to their nonreading contemporaries, and deficient readers have been compared to normal readers. The findings suggest that early readers are at higher levels of operativity than nonreaders of the same chronological age. And, children who are not reading disabled are also further along in terms of cognitive development than those children of the same age who are considered reading disabled. The following studies lend credence to these interpretations.

Marilyn J. Hurta compared reading-disabled children between the ages of 7.0 and 8.5 with children considered to be not reading disabled. Children were considered reading disabled if they were reading six months or more below their anticipated reading level. Hurta found that significance between reading and the ability to conserve depended on the conservation task involved. The only statistically significant difference between children classified as reading disabled and those classified as not reading disabled on conservation tasks on the CAK-C was found in the conservation of length. While this was the only area in which the differences in the level of functioning were significant, Hurta did note a statistically significant difference between the two groups in terms of their stage of development as determined by the

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[139]Alan S. Kaufman and Nadeen L. Kaufman, "Tests Built from Piaget's and Gesell's Tasks as Predictors of First-Grade Achievement," Child Development, XLIII (June, 1972), 521-535.

children's performance on all the tasks administered.[140]

James W. Stanfill looked at second graders' ability to conserve in relation to reading achievement. He replicated the Piagetian number conservation and continuous quantity tasks developed by Almy and others. He found reading achievement to be significantly related to the ability to conserve for the total sample of beginning second grade students. When the sample was broken down into "achievers" and "low achievers" in reading, the relationship to conservation remained significant for "achievers" but not for "low achievers."[141]

Chari Briggs and David Elkind compared children not reading when they entered kindergarten to children who entered kindergarten already reading. They found that in general early readers scored higher on operativity measures than their nonreading counterparts, indicating that the early readers were more advanced in operational thought.[142]

Briggs and Elkind's follow-up study extended and replicated their earlier investigation. Using the CAK-C they again found earlier readers were superior to the controls on measures of conservation. They suggested that it was possible that an even greater difference might have been noted if the two groups had been tested during the same time of year. The early readers were tested on the CAK-C in the fall and the

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[140]Marilyn J. Hurta, "The Relationship Between Conservation Abilities on Selected Piagetian Tasks and Reading Ability" (doctoral dissertation, East Texas State University, 1972), pp. 87-90.

[141]James W. Stanfill, "Relationship Between Reading Achievement and Piaget's Conservation Tasks for Beginning Second Grade Students" (doctoral dissertation, University of Southern California, 1975), p. 95.

[142]Chari Briggs and David Elkind, "Characteristics of Early Readers," Perceptual and Motor Skills, XLIV (June, 1977), 1235-1236.

controls were not tested until spring.[143]

Summary

Although the number of studies relating Piagetian tasks to reading readiness and reading achievement is on the increase, the development of standardized measurement instruments has not expanded. The Concept Assessment Kit--Conservation remains the only such instrument. Several studies have replicated earlier procedures but as yet no attempt to standardize them has appeared in the literature. Because of the variety of conservation tasks it is difficult to make comparisons among the studies.

Studies using the CAK-C have noted significant but moderate correlations between conservation tasks and reading-related skills such as vocabulary, oral and written expression, and reading comprehension. More research is needed using the CAK-C to validate these preliminary indications.

The predictive value of conservation tasks is still under investigation. Studies seem to indicate that they have value when used in conjunction with reading readiness tests.

Comparative studies among groups reading at different levels suggest early readers are more successful at conservation tasks. Better readers are more likely to be conservers and further along in terms of cognitive development.

These conclusions are by no means accepted fact and there have been several studies to dispute them. Because of the variety of

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[143]Chari Briggs and David Elkind, "Cognitive Development in Early Readers," Developmental Psychology, IX (September, 1973), 279-280.

conservation tasks it is difficult to make comparisons among the studies. The lack of standardized instruments and the, as yet, sparse use of the CAK-C make comparisons difficult.

The final section of this chapter deals with the few recent studies focusing on conservation and linguistic awareness and their relationship to reading achievement.

Linguistic Awareness and Cognitive Development

Recently, researchers have begun to consider the possibility of a link between linguistic awareness and the Piagetian stages of cognitive development. The literature and research reviewed in this section focuses on linguistic awareness and its possible relationship to cognitive development.

I. Lundberg pointed to the need to study linguistic awareness in relation to cognitive development. He saw the need to find out, "Is there a reciprocal relationship between learning to read and the developmental changes in metalinguistic competence?"[144]

J. F. Reid, whose work is the basis of much of the research in linguistic awareness, wondered how much difference it would make if children were systematically exposed to reading terminology, purposes, and processes. She expressed the opinion that it might well be that in addition to making a difference in the child's learning to read, it might also make a difference in the child's logical thinking.[145] Thus,

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[144] Inqvar Lundberg, "Aspects of Linguistic Awareness Related to Reading," The Child's Conception of Language, eds. A. Sinclair, R. J. Jarvella, and W. J. M. Levelt (New York: Springer-Verlag, 1978), p. 94.

[145] J. F. Reid, "Learning to Think About Reading," Educational Research, IX (November, 1966), 62.

she indicated the possibility of a link between linguistic awareness and cognitive development.

Likewise, Marie Clay and M. D. Vernon hinted at a possible connection between cognitive development and linguistic awareness. Vernon, in her work with remedial students, found reading to be more than "perception of memory and visual shapes and sounds." She saw it as a more complex cognitive process that required the child "to reason about the relationship between the printed symbols of the text and the verbal symbols of language which indicate its meaning."[146] Clay found more capable readers showing an awareness and flexibility that readers showing poorer progress lacked. They were able to use cues either from large chunks of language or parts-within-wholes, giving them the ability to use a sound, word, or phrase as a single unit. Poorer readers lacked this flexibility and are "more specific in what they know and more rigid in what they can do with it."[147] The understanding of parts-within-wholes shows a higher level of cognitive development in Piagetian theory, and Clay indicated that a higher level of flexibility and awareness contributed to successful reading achievement.

Courtney B. Cazden also defined metalinguistic awareness as one aspect of general cognitive development[148] and found it to be less easily and less universally acquired than speaking and listening.[149] Downing,

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[146] M. D. Vernon, Reading and Its Difficulties (Cambridge: University Press, 1971), p. 77.

[147] Marie M. Clay, Reading: The Patterning of Complex Behavior (London: Heinemann Educational Books, 1972), p. 157.

[148] Courtney B. Cazden, Child Language and Education (New York: Holt, Rinehart and Winston, 1972), p. 91.

[149] Ibid., p. 96.

in his 1970 study, looked at how the types of stimuli affected the level of attainment of linguistic concepts. By using concrete stimuli in addition to the verbal interview procedures used in Reid's study, Downing found that children achieved much more when concrete objects (e.g., books, toys with writing on them, and pictures showing people reading) were presented within the interview procedure. He stated that his study provided further "evidence of the relevance of Piaget's and Vygotsky's general conclusions on children's thinking."[150]

Marjorie H. Holden and Walter H. MacGinitie found that the ability to segment language and the transition to concrete operations occur at approximately the same time. They too suggested a connection between the awareness of words and operational thinking. They suggested that if, in fact, there is a connection, then trying to teach a preoperational child to read while assuming that he or she is capable of analyzing and synthesizing the relationships between words "may be analogous to trying to train Piagetian operations."[151]

Research attempting to substantiate the relationship between linguistic awareness and cognitive development has been slow to appear. Three researchers have recently looked closely at the relationship between cognitive development and linguistic awareness. The CAK-C was used to assess cognitive development in two of the studies and seriation tasks were used in the third. All three noted significant relationships

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[150]John Downing, "Children's Concepts of Language in Learning to Read," Educational Research, XII (February, 1970), 111.

[151]Marjorie H. Holden and Walter H. MacGinitie, Metalinguistic Ability and Cognitive Performance in Children from Five to Seven, U.S., Educational Resources Information Center, ERIC Document ED 078 436, 1973.

between linguistic awareness and cognitive development.

Richard Atkins replicated the interview procedure developed by J. F. Reid and John Downing to discover children's understanding of the reading process. During his interview with 93 readers and nonreaders between the ages of three and eight years of age, he attempted to discover if there were parallels between the sequential development of cognitive development according to Piaget's theory and a possible sequence in children's understanding the concepts of the reading process.

According to Atkins' findings, readers and nonreaders were at different levels in their conception of the reading process. There was a gradual trend toward acquiring a more complex notion of the reading process.[152] A strong relationship between the Piagetian stage of general cognitive development as measured by the CAK-C and the levels of understanding the reading process for the total sample was noted. This relationship remained when the sample was examined in terms of readers and nonreaders, although the significance level for each group was lower than for the total sample.[153] For the nonreaders, the level of conception of the reading process correlated significantly with the following tasks on the CAK-C: two dimensional space, substance, and both continuous and discontinuous quantity. For readers, a significant relationship was found between the levels of conception of the reading process and the weight, substance and continuous quantity tasks on the CAK-C.[154]

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[152]Richard P. Atkins, "The Development of Children's Selected Concepts of the Reading Process and Their Relationship to Piagetian Theory" (doctoral dissertation, University of Pittsburg, 1978), pp. 94-95.

[153]Ibid., p. 68. [154]Ibid., p. 69.

Alyce P. Jewell examined the predictability of conservation and metalinguistic awareness for first grade reading achievement in addition to looking at the relationship between linguistic awareness and cognitive development. She tested children in kindergarten and then again in the fall of first grade. Her Metalinguistic Awareness Battery consisted partly of subtests developed by Evans, Taylor and Blum, mentioned earlier in this chapter.

Like Atkins, she noted significant correlations between metalinguistic awareness and conservation. Kindergarten performance on the metalinguistic tasks in May was highly predictive of first grade reading achievement. The scores on the initial administration of the CAK-C during kindergarten showed a small significant correlation with the vocabulary (.29) subtest and a moderate correlation with the comprehension (.36) subtest on the Gates-MacGinitie Reading Test given during first grade. Three subtests of the metalinguistic battery--phonemic awareness, graphemic awareness and aural consonant cloze--were the most effective combined predictors. The kindergarten testing of the CAK-C was not found to be an effective predictor of first grade reading achievement.[155]

Conservation scores (CAK-C) were significantly related to reading achievement scores but did not significantly affect the regression prediction.[156] Five of the six measures of metalinguistic awareness were related moderately to performance on the CAK-C.[157] Jewell's findings suggested that there may be an order of difficulty in the different aspects of metalinguistic awareness related to written

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[155] Jewell, op. cit., p. 168. [156] Ibid. [157] Ibid., p. 169.

language. She noted a gradual increase in metalinguistic scores between the kindergarten testing and each of the first grade testing dates. Correlations ranged from .11 to .45 and all were significant except graphemic awareness (i.e., awareness of symbols as letters and differences between letters and other symbols).[158]

As mentioned previously, Holden used seriation tasks rather than conservation tasks as determiners of cognitive developmental level. Linguistic awareness or metalinguistic awareness was defined in terms of a Word Awarness Test (WAT) developed by the author. On this test, 100 kindergartners and first graders were asked to identify new words added to verbally presented lists of words, a phrase, or a sentence.[159] A moderate relationship was found between the two variables, linguistic awareness and cognitive development. The correlation coefficient between the total scores for both variables for the total sample was .41. It was .46 when only the Piagetian seriation tasks were correlated with the WAT. Total scores on the WAT correlated moderately (.38) with the total reading achievement scores on the Gates-MacGinitie Reading Test in first grade.[160]

A dichotomous analysis showed that there were very few children reaching concrete operations, as defined by the seriation tasks, who did not also attain a more advanced linguistic level. She did, however, find a number of linguistically advanced children, as measured by the

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[158]Ibid., p. 167.

[159]Marjorie J. Holden, "Metalinguistic Performance and Cognitive Development in Children from Five to Seven" (doctoral dissertation, Columbia University, 1972), pp. 38-40.

[160]Ibid., p. 85.

WAT, who were not at the level of concrete operations.[161] The use of seriation rather than conservation and the word awareness definition make it difficult to compare results with the previous two studies.

Although Papandropoulou and Sinclair did not measure cognitive development, their findings suggested the possible role of cognitive development in linguistic awareness. They interviewed 102 children between the ages of 4 years 5 months and 10 years 10 months. They found four levels of understanding of the concept of a word, starting with no differentiation between words and things. Not until seven or eight did children recognize that meaning linked words and things. And, it was not until the fourth level, 8 to 10 years old, that words became meaningful units.[162] Not until children reached the level of concrete operations described in Piagetian theory were they able to begin to deal with the concept of a word.

Researchers are just beginning to examine the possible connection between linguistic awareness and cognitive development. Theoretically, several researchers suspect a possible connection. Studies conducted thus far seem to indicate a moderate relationship between the two and also note a sequential development of linguistic awareness much like that noted by Piaget. These findings must be considered very tentative and more research is needed.

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[161] Ibid., p. 114

[162] Ioanna Papandropoulou and Hermine Sinclair, "What is a Word?" Human Development, XVII (July/August, 1974), 247-249.

Summary

Literature relevant to this study has been reviewed in this chapter. Research reviewed focused on three areas. The first section presented two conflicting views about the need for linguistic awareness and research conducted thus far in determining the relationship between linguistic awareness and reading. According to those supportive of the need for linguistic awareness there are two main categories within the reading task about which children seem to need understanding in order to read successfully. Research done in both these areas, the functional and featural concepts of literacy, was reviewed. From these studies it was apparent that most young children begin the task of learning to read confused about the functions and characteristics of reading.

The second section outlined pertinent aspects of Piagetian theory at the time children are dealing with learning to read. Research relating abilities on Piagetian tasks to reading achievement was reviewed. Significant but moderate links between reading achievement and scores on Piagetian tasks were reported. Although implications are that children able to conserve on Piagetian tasks learn to read more easily, and better readers in the early stages are more likely to be conservers and further along in terms of cognitive development, these conclusions are by no means accepted fact and research continues.

The final section dealt with the few recent studies focusing on conservation and linguistic awareness and their relationship to reading achievement. Researchers have only recently begun to examine a possible connection between linguistic awareness and cognitive development. Moderate relationships between the two have been noted by the few

research studies conducted thus far. Research is continuing and these tentative findings need further validation.

Chapter 3

METHODOLOGY

The purpose of this study was to examine the linguistic awareness and conservation of third grade students and their relationship to reading achievement. Chapter three describes the procedures used to complete the study. Section one describes the characteristics and selection of the subjects. Section two gives information about the instruments used in the study. Section three reports the research procedures. And, the final section delineates the treatment of the data.

Description and Selection of the Students

Both schools chosen for this study were Title I schools in a large city school district. Title I of the Elementary and Secondary Education Act of 1965 provides funding for educational programs to benefit students from low income families. Title I funds are allocated based on the number of low income families in each county. School districts receive Title I money based on Aid to Families with Dependent Children (AFDC) data. Schools with a poverty level in excess of the district average receive funds.[1]

Once a school receives funds, students are selected to participate according to their score on a standardized achievement test. Those

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[1] Title I/State Compensatory Education Programs Handbook (Sacramento Unified School District: Consolidated Programs Department, 1980), p. 11.

scoring below the fiftieth percentile are eligible for participation in the program; the youngest eligible children within the district are served first.[2] Title I programs provide eligible pupils with reading, mathematics, and language arts instruction over and above that provided by the district. The two schools from which subjects were chosen ranked fourth and sixteenth of the 56 district elementary schools in terms of eligibility for Title I service.

Minority students make up the greatest percentage of students in both schools. The school ranked fourth on the Title I eligibility list had 31 percent Black, 51.3 percent Hispanic, and 15.6 percent White enrollment. The school ranked sixteenth had 32.8 percent Black, 16 percent Hispanic, and 47.3 percent White enrollment.[3]

All third grade students (115) in both schools were given the Primary Level II, Form A, battery of the Stanford Achievement Test--Reading (SAT-R). Children classified as limited English speakers were eliminated. All the students (37) scoring above the 50th percentile on the total reading score on the SAT-R were included in the study. The following procedure was followed in order to have approximately the same number of students scoring below the 50th percentile. Twelve students were randomly selected, using the table of random numbers, from each stanine below the fiftieth percentile. No children scored in the first stanine. This produced a sample of 85 students. Three children moved away before completing all the tests. The remaining 82 completed the entire study.

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[2]Ibid.

[3]Sacramento City Unified School District, Ethnic Survey Report, Fall, 1980 (mimeographed).

The 82 children in the sample ranged in age from 7.0 to 10.1 years. The youngest child had recently been moved up from the second to the third grade. The oldest children had been retained in one of the three grades previously.

Description of the Instruments

Four instruments were used to test children's reading achievement, linguistic awareness, and conservation ability. The following subsections describe each instrument and discuss the validity and reliability established on each instrument.

Stanford Achievement Test--Reading (SAT-R)

The SAT-R was chosen to measure overall reading achievement since it is one of the best survey tests for measuring the general reading achievement of students and had been found to be useful for comparative purposes.[4] The development of the test was done with a large and carefully selected stratified sample from the total student population in the United States. Reliability coefficients reported are in the high .80s to mid-.90s.[5]

The Primary II battery used in this study was designed to be used with students from the middle of grade two to the end of grade three. The battery includes a subtest for measuring "Word Meaning,"

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[4]Roger Farr and Nicholas Anastasiow, Tests of Reading Readiness and Achievement (Newark, Delaware: International Reading Association, 1969), p. 45.

[5]Earl F. Rankin, "Stanford Achievement Tests: Reading Tests," The Eighth Mental Measurements Yearbook, ed. O. K. Buros (Highland Park, New Jersey: Gryphon Press, 1978), p. 1224.

"Paragraph Meaning" and a decoding test called "Word Study Skills." The correlations between the "Word Meaning" and "Paragraph Meaning" subtests for the Primary II was .83.[6]

The "Word Meaning" subtest measures the students' ability to pick the final word of an incomplete sentence from four aternatives. The "Paragraph Meaning" subtest has the student supply the missing word in a paragraph. Four alternatives are also provided. The "Word Study Skills" subtest is divided into three parts. The first two measure students' auditory discrimination for beginning and ending sounds and the third part measures students' ability, without having words pronounced for them, to match an underlined word part with a word having the same sound. For grade three, the correlation of this subtest with the "Word Meaning" and "Paragraph Meaning" subtest was .73.[7]

A careful tryout and review of items by a variety of reading specialists and classroom teachers was done to enhance content validity.[8] The coverage of reading skills is thought to adequately represent the reading taught in the schools. In technical quality, content validity, and completeness, this test was assessed as equal to other major achievement tests such as the Metropolitan Achievement Test, Iowa Achievement Test, or California Achievement Test.[9]

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[6]Farr and Anastasiow, op. cit., pp. 42-43.

[7]Ibid., pp. 43-44.

[8]Richard Madden and others, Stanford Achievement Test, Technical Data Report (New York: Harcourt Brace Jovanovich, 1975), p. 35.

[9]Gene V. Glass, "Stanford Achievement Tests: Reading Tests," The Eighth Mental Measurements Yearbook, ed. O. K. Buros (Highland Park, New Jersey: Gryphon Press, 1978), p. 1223.

Reliability coefficients were computed by means of the Spearman-Brown Formula and the Kuder-Richardson Formula 20. For the reading tests in the Primary II battery, these coefficients ranged from .84 to .96 for Form A at the beginning of third grade.[10]

Concept Assessment Kit--Conservation (CAK-C)

The Concept Assessment Kit--Conservation was designed to assess the cognitive developmental level of preschool and early school-age children. The kit was constructed to provide a measure of children's comprehension of the concept of conservation. Items were developed on the basis of the developmental theory of cognitive structure by Jean Piaget. Conservation in Piagetian theory is thought to represent a pivotal construct in children's cognitive transition from the preoperational to the concrete operational stage.[11]

The test measures children's conservation behavior as well as their understanding of the principle involved. The children must indicate the presence or absence of conservation as well as specify the reason for the answer given. In order to get a correct score, children must understand that if two objects originally have equal amounts, changing an irrelevant dimension does not change the relationship. To receive the maximum of two points on each task, children must, in addition to saying that the relationship remains the same, be able to explain why there is no change.

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[10] Madden and others, loc. cit.

[11] Marcel L. Goldschmid and Peter M. Bentler, "Concept Assessment Kit--Conservation," Educational Implications of Piaget's Theory, eds. I. J. Athey and D. O. Rubadeau (Waltham, Massachusetts: Ginn-Blaisdell, 1970), p. 344.

The CAK-C Form A consists of six tasks: two-dimensional space, number, substance, continuous quantity, weight and discontinuous quantity. Each task requires children to conserve when transformations are made to the objects within each task. The procedures are standardized for each subject. Children compare the relative continuous and discontinuous quantity, weight, substance, space, and number of two objects when the form or shape of one of them has been changed by manipulation. Before a transformation is made, the examiner makes sure that the subject sees that the two objects were initially equivalent. In addition to determining whether the two objects remain equivalent after the transformation, the subject is asked to explain his response. The maximum score is 12. One point is given for each judgment and one point is given for each correct explanation on the six conservation tasks.[12]

The test developers, Marcel L. Goldschmid and Peter M. Bentler, indicated that the assessment could be used successfully with children from kindergarten to third or fourth grade. It was designed to introduce a greater measure of consistency and statistical accuracy into the research on conservation.[13]

Reliability coefficients using the Kuder-Richardson Formula 20 ranged from .89 to .92 for the three possible scores: behavior, explanation, and behavior and explanation for 143 kindergarten, first,

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[12]Marcel L. Goldschmid and Peter M. Bentler, "The Dimensions and Measurement of Conservation," Child Development, XXXIX (September, 1968), 787.

[13]Marcel L. Goldschmid and Peter M. Bentler, Manual: Concept Assessment Kit--Conservation (San Diego: Educational and Industrial Testing Service, 1968), p. 4.

and second grade children. In a cross validation study of the conservation tasks involving 107 middle class kindergarten, first, and second grade children, the Kuder-Richardson Formula 20 was .96. And, the K-R 20 internal consistency reliabilities remained constant for the new sample.[14]

The authors indicated that the validity studies which they conducted demonstrated that conservation has significant implications for school achievement. They found conservation significantly and moderately correlated with school grades in arithmetic, social studies, science, and vocabulary. Also, the correlation between overall grade point average and conservation was almost as high (.45).[15]

To norm the instrument, an attempt was made to locate testing centers which represented the entire socioeconomic and racial composition of the society. The authors note a slight sampling bias toward lower middle class children.[16]

Concepts About Print (Sand) Test

The Concepts About Print (Sand) Test was designed by Marie M. Clay to determine young children's knowledge of print concepts. The Sand test consists of a children's picture book entitled Sand that the interviewer reads to the student. During the reading, the student is asked 24 questions which determine if the student understands significant concepts about printed language such as the functions of space,

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[14]Goldschmid and Bentler, "The Dimensions and Measurement of Conservation," p. 787.

[15]Ibid., p. 797.

[16]Goldschmid and Bentler, Manual: Concept Assessment Kit--Conservation, p. 14.

that the print (not the picture) tells the study, rules of directionality, differences between letters and words, and the use of punctuation.[17] Each question is scored right or wrong, yielding scores between 0 and 24.

Clay's research group consisted of 320 urban children between the ages of five and seven. A reliability coefficient of .95 was reported when the research group was compared to an age-matched group taking the test in 1967. She also reported a .79 correlation between Sand scores and "word reading" for 100 children. The information available did not indicate the test on which the determination of word reading was based.

Other research done subsequently has added credence to Clay's findings. Kaaren Day and H. D. Day computed test-retest and split-half reliability coefficients on four administrations of the Sand during kindergarten and first grade. Spearman-Brown estimates ranged from .84 to .88. Kuder-Richardson Formula 20 coefficients ranged from .83 to .92. The lowest reliability was on the test-retest coefficients. These were .73 to .89.[18]

Jerry L. Johns also applied the Kuder-Richardson Formula 20 to an odd-even split of items on the Sand taken by first graders. He found the reliability for males to be .86, for females .76, and .82 for the total sample.[19]

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[17] Clay, The Early Detection of Reading Difficulties, p. 10.

[18] H. D. Day and Kaaren C. Day, Reliability and Validity of the Concepts About Print and Record of Oral Language, U.S., Educational Resources Information Center, ERIC Document ED 179 932, 1979.

[19] Johns, "First Graders' Concepts About Print," p. 537.

In terms of validity, Day and Day found the Sand to be positively correlated with all subtests of the Metropolitan Readiness Test. The high correlations between the final first grade administration of the Sand and the MRT indicated to Day and Day that the Sand might be useful in "verifying or elaborating the readiness revealed by the MRT in the first grade."[20]

Technical Language of Literacy (TLL)

The "Technical Language of Literacy" is the third subtest of a recently designed test, Linguistic Awareness in Reading Readiness (LARR) by Douglas Ayers, John Downing, and Brian Schaefer. The "TLL" consists of samples of written or printed language. It tests children's knowledge of technical terminology used in reading instruction such as "letter," "number," and "word." Children must show that they can correctly identify these by circling with a pencil.[21]

This subtest was included in the study because Ayers and Downing[22] have found it to be a significant predictor of reading achievement as measured by the Cooperative Primary Reading Test. Downing, Ollila, and Oliver[23] found the Kuder-Richardson reliability coefficients for the "Technical Language of Literacy" subtest to be .87 and .83 when kindergartners were tested during the second and ninth months after

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[20]Day and Day, loc. cit.

[21]Douglas Ayers and John Downing, "Children's Linguistic Awareness and Reading Achievement," University of Victoria, Canada, 1980, p. 3 (mimeographed).

[22]Ibid., p. 6.

[23]John Downing, Lloyd Ollila, and Peter Oliver, "Concepts of Language in Children from Differing Socio-Economic Backgrounds," Journal of Educational Research, LXX (May/June, 1977), 280.

beginning kindergarten. Ayers and Downing also found Kuder-Richardson reliabilities to be .90 and .93 when the subtest was given as part of the Linguistic Awareness in Reading Readiness Test when given twice at the end of kindergarten.[24]

Since the "Technical Language of Literacy" subtest tests many of the same concepts as the Sand, it was thought that it would add to the information obtained from the Sand.

Data Collection Procedures

Permission to conduct this study was obtained from the Research and Development Services Office of the Sacramento City Unified School District. Principals in both schools and the five third grade teachers agreed to participate. Testing began in October, 1980.

All 115 third grade students were given the Primary II Form A Stanford Achievement Test--Reading as a group in their third grade classroom. The test was administered by the researcher with the help of the classroom teachers according to the directions in the appropriate manual. The sample was chosen based on the total reading score for each child. All 37 children scoring above the fiftieth percentile were included in the study and 12 children were randomly chosen from each quartile below the 50th percentile. This provided a sample of 85. Three children were eliminated during the study because they moved before completing all aspects of it.

The following tests were given to each child individually and in the same order: Concept Assessment Kit--Conservation (CAK-C), Concepts

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[24]Ayers and Downing, op. cit., p. 7.

About Print (Sand) Test, and "Technical Language of Literacy" ("TLL"). This testing was done in a small room adjacent to the regular classroom so that the child could concentrate on the task without interruption. Testing was completed in one sitting, with all children eager participants. Each child was with the researcher between 30 and 45 minutes.

For both the CAK-C and the Sand, the researcher scored the children's oral responses as the testing proceeded. The "TLL" is a paper and pencil test in which children circle their responses based on verbal questions by the examiner. These were scored after the child left the room.

Treatment of the Data

In order to answer the research questions proposed, the following analyses of data were performed using the Statistical Package for the Social Sciences (SPSS).[25]

Bivariate correlation was performed using the SPSS subprogram PEARSON CORR to investigate the relationship between the following pairs of variables: Sand and CAK-C, "TLL" and CAK-C, Sand and "TLL." The Sand, CAK-C, and "TLL" were each correlated with each component of the SAT-R: decoding, vocabulary, comprehension, and total reading. The results of these Pearson product-moment correlations were used to investigate research questions one, two, and three.

In order to answer research question four, a forward stepwise inclusion using the SPSS multiple regression subprogram REGRESSION

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[25]Norman H. Nie, C. Hadlai Hull, Jean G. Jenkins, Karin Steinbrenner, and Dale H. Bent, Statistical Package for the Social Sciences (2d ed.; New York: McGraw-Hill, 1975).

analyzed the relationship between the dependent reading variables and the three predictor variables, Sand, "TLL" and CAK-C. This was done to determine the best predictor of the criterion variables of reading achievement.

Research question five raised the question of differences between the abilities of boys and girls on conservation tasks, reading achievement, and linguistic awareness. The SPSS subprogram T-TEST was used to test the significance of the differences in the means on the Sand, "TLL," CAK-C, and the total reading score for the boys and girls in the study.

In order to test for possible spurious relationships, the SPSS subprogram PARTIAL CORR was performed to investigate the relationship between two of the variables while adjusting for the effects of one or two additional variables.

Summary

Chapter Three described the procedures used to complete the study. The description and selection of the subjects was presented. A description of all the instruments used in the study was provided. Research procedures were outlined and treatment of the data delineated.

Chapter Four will present the results of the study. The statistical analyses related to the five research questions will be outlined and discussed.

Chapter 4

ANALYSIS OF THE RESULTS

The purpose of this study was to examine linguistic awareness and conservation and their relationship to the reading achievement of third grade students. This chapter presents the results in relation to the five research questions presented in Chapter One.

Research Question One

> Is there a relationship between the vocabulary, comprehension, decoding, and total reading score of third grade students and their level of linguistic awareness?

Linguistic awareness was measured with two instruments: the Concepts About Print (Sand) Test and the "Technical Language of Literacy" ("TLL") subtest of the Linguistic Awareness Reading Readiness Test. To investigate the question, Pearson product-moment correlations were computed between the subtests (vocabulary, decoding, comprehension, and total score) of the Stanford Achievement Test--Reading (SAT-R) and the scores on the Sand and the "TLL." The results are reported in Table 1.

Although all the correlations were significant ($p < .001$), the correlations between the Sand and the subtests of the SAT-R were higher than those between the SAT-R and the "TLL," with the exception of the vocabulary score. The highest correlation was a moderately high (.66) relation between the variables "decoding" and Sand. Approximately 44 percent of the variation in the decoding score was explained by knowing the student's score on the Sand. There appeared to be a moderately high

tendency for students who scored high on the Sand to score high on the decoding subtest.

Table 1

Summary of the Pearson Product-Moment Correlations for the Component Subtests of the SAT-R and the Sand, CAK-C, and the "TLL" (N = 82)

		Vocabulary	Comprehension	Decoding	Total Reading
Sand	r	.468**	.587**	.660**	.649**
	r^2	.219	.345	.436	.421
"TLL"	r	.530**	.417**	.502**	.474**
	r^2	.281	.174	.252	.225
CAK-C	r	.422**	.331**	.291*	.334**
	r^2	.179	.110	.085	.112

*p < .01
**p < .001

There was also a moderately high relation between the Sand and the total reading score (.649). Approximately 42 percent of the variation in the total reading score was explained by knowing the student's score on the Sand. There appeared to be a moderately high tendency for students who score high on the Sand to score high on the total reading score.

The highest correlation for the "TLL" was with the vocabulary score (.530). Approximately 28 percent of the variation in the vocabulary score was explained by knowing the student's score on the "TLL." There appeared to be a moderate tendency for students who score high on

the "TLL" to score high on the vocabulary subtest. The Sand correlation with vocabulary, although significant ($p < .001$), was .468. This was the lowest correlation between the Sand and the SAT-R subtests.

Overall, correlations between the Sand and "TLL" and the SAT-R were significant ($p < .001$) and ranged from .417 to .660. There was a moderate to moderately high tendency for students who score high on linguistic awareness measures to also score high on components of the SAT-R.

Research Question Two

> Is there a relationship between the vocabulary, comprehension, decoding, and total reading score of third grade students and their conservation ability?

Conservation ability was measured by the score on the Concept Assessment Kit--Conservation (CAK-C) and reading skills were measured by the Stanford Achievement Test--Reading (SAT-R). Results are also reported in Table 1. All the SAT-R subtests were significantly ($p < .001$) and moderately correlated with the CAK-C with the exception of decoding. The decoding score and the CAK-C correlation was significant ($p < .01$) but the correlation was small (.291).

The highest correlation between the SAT-R and the CAK-C was on the vocabulary subtest (.422). The probability of this result occurring by chance was less than one in 1000. There was a moderate relation between the variables "conservation" and "vocabulary." Approximately 18 percent of the variation in the student's vocabulary score was explained by knowing the student's score on the CAK-C.

Overall, there was a moderate tendency for students who scored high on the CAK-C to also score high on the SAT-R. The tendency was for

the correlations between conservation and reading achievement to be smaller than those between linguistic awareness and reading achievement.

Research Question Three

Is there a relationship between conservation ability and the level of linguistic awareness?

Conservation ability was measured by the CAK-C and linguistic awareness was measured by the Concepts About Print (Sand) Test as well as the "Technical Language of Literacy" ("TLL") subtest of the Linguistic Awareness in Reading Readiness Test (LARR). The Pearson product-moment correlations are presented in Table 2.

Table 2

Pearson Product-Moment Correlations for the Sand, CAK-C, and the "TLL" (N = 82)

		CAK-C	"TLL"
Sand	r	.290*	.644**
	r^2	.084	.415
CAK-C	r		.388**
	r^2		.151

*p < .01
**p < .001

The correlation between the two measures of linguistic awareness was .644. Approximately 41 percent of the variation in the student's Sand score was explained by knowing the student's score on the "TLL." All three independent variables were significantly correlated with each

other. The CAK-C correlated moderately with the "TLL" (.388). Approximately 15 percent of the variation in the student's CAK-C score was explained by knowing the student's score on the "TLL." The CAK-C correlation with the Sand was small (.290) with approximately eight percent of the variation in the student's CAK-C score being explained by knowing the student's score on the Sand.

Research Question Four

> Which is the best predictor of third grade reading achievement, linguistic awareness or cognitive development?

A stepwise forward inclusion multiple regression was computed to determine the best predictor of third grade reading achievement. Since the SAT-R is divided and scored in four areas, each of these was analyzed separately.

Vocabulary. The results of the analysis of the vocabulary score are summarized in Table 3. There is a moderate relation between the

Table 3

Summary of the Stepwise Regression Analysis of the Sand, CAK-C, and the "TLL" as Predictors of the Vocabulary Score on the SAT-R (N = 82)

Dependent Variable	Step	Predictor Variable	Multiple R	R^2	F
SAT-R Vocabulary	1	"TLL"	.530	.281	31.297*
	2	CAK-C	.580	.336	20.020*
	3	Sand	.599	.359	14.582*

*$p < .001$

vocabulary test of the SAT-R and the three variables: the two measures of linguistic awareness and conservation. Approximately 36 percent of the variation in the vocabulary test scores can be accounted for by knowing a student's status on the three predictor variables. The original sample value of r = .599 was a good estimate of the population since r' = .579. The linguistic awareness variable, "Technical Language of Literacy," was the best predictor of the vocabulary score on the SAT-R, followed by the conservation tasks, CAK-C, and then the Sand.

Comprehension. The results of the analysis of the comprehension scores are presented in Table 4. There is a moderate relation between

Table 4

Summary of the Stepwise Regression Analysis of the Sand, CAK-C, and the "TLL" as Predictors of the Comprehension Score on the SAT-R (N = 82)

Dependent Variable	Step	Predictor Variable	Multiple R	R^2	F
SAT-R Comprehension	1	Sand	.587	.345	42.130*
	2	CAK-C	.611	.373	23.495*

*p < .001

the two variables, Sand and CAK-C, and the comprehension subtest of the SAT-R. Approximately 37 percent of the variation in the comprehension score can be accounted for by knowing a student's status on both these predictor variables. The "TLL" subtest was not significantly correlated with the comprehension test. The original sample value of r = .611 was a good estimate of the population since r' = .592. The Sand was the

best predictor of the comprehension score on the SAT-R, followed by the CAK-C. The "TLL" failed to meet the F test for significance and consequently was not included in the regression formula. Apparently, the "TLL" did not lend any unique contribution to the variance of the comprehension score.

Decoding. The analysis of the decoding scores is summarized in Table 5. There is a moderate relation between the three variables and

Table 5

Summary of the Stepwise Regression Analysis of the Sand, CAK-C, and the "TLL" as Predictors of the Decoding Score on the SAT-R (N = 82)

Dependent Variable	Step	Predictor Variable	Multiple R	R^2	F
SAT-R Decoding	1	Sand	.660	.435	61.671*
	2	CAK-C	.668	.446	31.817*
	3	"TLL"	.672	.452	21.416*

*p < .001

the decoding score on the SAT-R. Approximately 45 percent of the variation in the decoding score can be accounted for by knowing a student's status on the three predictor variables. The original sample value of r = .672 was a good estimate of the population since r' = .656. The Sand was the best predictor of the decoding score on the SAT-R, followed by the conservation tasks (CAK-C) and the "TLL."

Total Reading. The results of the analysis of total reading scores are summarized in Table 6. There is a moderate relation between the three variables and the total reading score on the SAT-R. Approxi-

Table 6

Summary of the Stepwise Regression Analysis of the Sand, CAK-C, and the "TLL" as Predictors of the Total Reading Score on the SAT-R (N = 82)

Dependent Variable	Step	Predictor Variable	Multiple R	R^2	F
SAT-R Total Reading	1	Sand	.649	.421	58.250*
	2	CAK-C	.667	.444	31.600*
	3	"TLL"	.667	.446	20.890*

*$p < .001$

mately 44 percent of the variation in the total reading score can be accounted for by knowing a student's status on the three predictor variables. The original sample value of r = .667 was a good estimate of the population since r' = .651. The best predictor of the total reading score on the SAT-R was the Sand, followed by the CAK-C and the "TLL."

Overall, the Sand appeared to be the best predictor of third grade reading achievement on the SAT-R. The Sand was the best predictor of decoding, comprehension, and the total reading score. The vocabulary score was best predicted by the "TLL," with the Sand being third behind the CAK-C. The CAK-C was the second best predictor of all the subtests of the SAT-R.

Partial correlations were computed to see how well linguistic awareness measures ("TLL" and Sand) predicted performance on the vocabulary, comprehension, decoding, and total reading score when the effects of conservation (CAK-C) were controlled. And, also to see the predictive strength of conservation (CAK-C) on the above criterion variables when the effects of linguistic awareness were controlled. The partial correlations are summarized in Table 7.

Table 7

Summary Table of Partial Correlations for the Component Subtests of the SAT-R and the Sand, CAK-C and the "TLL" (N = 82)

	Controlling for CAK-C		Controlling for "TLL"	Controlling for Sand	Controlling for Sand & "TLL"
SAT-R	Sand	"TLL"	CAK-C	CAK-C	CAK-C
Voc.	.398***	.439***	.277**	.339***	.271**
Comp.	.544***	.332***	.202*	.207*	.197*
Dec.	.628***	.441***	.121	.139	.107
Tot. Rdg.	.612***	.397***	.185*	.200*	.181

*p < .05
**p < .01
***p < .001

When the effects of the CAK-C were partialed out, the correlations between the Sand and the SAT-R subtests ranged from .398 to .628. The correlations with the "TLL" ranged from .332 to .441. Correlations between the SAT-R and the Sand and "TLL" remained moderate and significant ($p < .001$). When the effects of the CAK-C were not

partialed out, the correlations ranged from .417 to .660.

However, when the effects of linguistic awareness were controlled, the correlations dropped more significantly. When the effect of the Sand was controlled, the correlation between decoding and CAK-C was not significant (.139). When the effect of the "TLL" was controlled, the correlation was also not significant (.121). With both "TLL" and the Sand controlled, it dropped further (.107). Also, with both "TLL" and the Sand partialed out, the correlation between the total reading score and the CAK-C was not significant (.181).

Research Question Five

> Are there differences between boys and girls in their ability to conserve, linguistic awareness, and reading achievement?

The results of the analysis of scores made by boys and girls revealed that boys and girls tended to perform similarly on the conservation, reading achievement and linguistic awareness tasks. The results are summarized in Table 8.

There were no significant differences between the performance of boys and girls on the conservation test (CAK-C), $t = .44$, $df = 80$. Boys and girls performed similarly on this conservation test.

There were no significant differences between the performances of boys and girls on the Sand, $t = .78$, $df = 80$. Since the F ratio was significant ($p < .05$), indicating that the two groups had different variances on the "TLL" subtest, it was necessary to use the t based on the separate variance estimate. Using the separate variance estimate, there was no significant difference between the performances of boys and girls on the "TLL" subtest, $t = .82$, $df = 54.26$. Boys and girls tended

Table 8

Summary of the T-Test Analysis of the Differences Between Boys and Girls on the Sand, "TLL," CAK-C, and the Total Reading Score on the SAT-R

Variable	F Value	Pooled Variance Estimate	Degrees of Freedom	Separate Variance Estimate
Sand	1.09	0.78*	80	
CAK-C	1.20	0.44*	80	
"TLL"	1.89		54.26	0.82*
Total Reading	1.27	1.10*	80	

*NS

to perform similarly on these two measures of linguistic awareness.

There was no significant difference between the performance of boys and girls on the total reading score on the SAT-R, $t = 1.10$, $df = 80$. As with the previous tasks, boys and girls scored similarly.

Summary of the Findings

The results of the study were presented in Chapter Four. The correlational analysis relating reading achievement with the two measures of linguistic awareness and the measure of conservation revealed that the correlations between the two measures of linguistic awareness and the SAT-R were all significant ($p < .001$). The Sand correlated higher than the "TLL" with reading achievement for all subtests except the vocabulary score.

Correlations between the conservation measure and reading achievement were also significant; however, the correlations were

smaller than between reading achievement and the measures of linguistic awareness. The correlations between the Sand and the "TLL" were moderately high. The CAK-C correlated more highly with the "TLL" (.388) than with the Sand (.290).

The findings of the stepwise inclusion multiple regression analysis suggested that the Sand was the best predictor of the decoding, comprehension, and total reading components of the SAT-R. The vocabulary score was best predicted by the "TLL." The CAK-C was the second best predictor for all the subtests of the SAT-R.

Partial correlational analysis revealed that controlling for the effects of conservation lowered the correlations between the linguistic awareness measures and reading achievement slightly but did not affect the significance of the relationship. However, when the effect of the linguistic awareness measures were controlled, the correlations between reading achievement and conservation dropped. The decoding and total reading score correlation with the CAK-C dropped to .107 and .181 respectively, neither of which was significant.

When examining the abilities of boys and girls in the areas of conservation, linguistic awareness, and reading achievement, the results of the t-tests indicated that, on the tests used in this study to evaluate performance in these areas, girls and boys tended to perform similarly. The pooled and separate variance estimates used were all not significant.

The final chapter summarizes the study and draws conclusions based on the analysis of the data presented in Chapter Four. Chapter Five also includes educational recommendations and suggestions for further study.

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This study was concerned with the relationship between reading achievement and variables thought to be related to reading success: linguistic awareness and cognitive development. This chapter contains a summary of the study, the conclusions derived from the analyzed results, educational recommendations, and suggestions for further study.

Summary

This study investigated the competencies of third grade students in linguistic awareness and cognitive tasks thought to be prerequisites for successful reading achievement. It explored the relationships between these variables and reading achievement when children reached the third grade. By looking at third graders, rather than younger children, the investigator attempted to discover if understanding the technical concepts involved in reading was related to reading achievement beyond the readiness level. The relationship between third grade reading achievement and cognitive development was also explored. In addition, the possible connection between linguistic awareness and cognitive development was investigated.

The literature review focused on three areas. The first indicated that linguistic awareness research has shown that most young children are confused about the functions and characteristics of reading when they begin the task of learning to read. The second reviewed

research relating abilities on Piagetian tasks to reading achievement. This research showed that children able to conserve on Piagetian tasks learn to read more easily, and read better in the early stages. Finally, literature was reviewed that linked conservation and linguistic awareness and their relationship to reading achievement. Moderate relationships between the two were noted in the few studies conducted thus far.

The subjects for this study were drawn from the third grade in two Title I schools in a large city school district. The sample consisted of 82 children chosen on the basis of their total reading score on the Stanford Achievement Test--Reading. All children scoring above the fiftieth percentile were included. A random sample of children scoring below the fiftieth percentile was chosen to balance the sample.

Four instruments were used to test children's reading achievement, linguistic awareness, and conservation ability. The Stanford Achievement Test--Reading was chosen to measure overall reading achievement. To assess cognitive development, the Concept Assessment Kit--Conservation was used. It was designed to provide a measure of children's comprehension of the concept of conservation. The Concepts About Print (Sand) Test and the "Technical Language of Literacy" ("TLL") subtest of the Linguistic Awareness in Reading Readiness Test were used to assess linguistic awareness. The Sand was designed to determine young children's knowledge of print concepts. The "TLL" tested children's knowledge of technical terminology used in reading instruction such as "letter," "number," and "word."

Data were entered into a computer using the Statistical Package for the Social Sciences (SPSS). Pearson product-moment correlations,

multiple regression, partial correlations, and t-tests were computed to analyze the results. The data presented in this study revealed the following.

The correlations between linguistic awareness and reading achievement were moderate (.417-.660) and significant ($p < .001$). The correlations between the Sand and the subtests of the SAT-R were higher than those between the "TLL" and the SAT-R, with the exception of the vocabulary score.

All the SAT-R subtests were significantly ($p < .001$) and moderately correlated with the CAK-C, with the exception of decoding. The decoding score and the CAK-C correlation was significant ($p < .01$) but the correlation was small (.291). The tendency was for the correlations between conservation and reading achievement to be smaller than those between linguistic awareness and reading achievement.

The CAK-C, Sand, and "TLL" were significantly correlated to each other. The two measures of linguistic awareness were more highly correlated (.644) to each other than with the conservation tasks. The "TLL" and CAK-C were more strongly correlated than the Sand and CAK-C (.290).

Multiple regression analysis determined that the Sand was the best overall predictor of third grade reading achievement. The vocabulary test was the only one on which the "TLL" was found to be the best predictor. The CAK-C was the second best predictor of all the subtests of the SAT-R.

Partial correlational analysis revealed that controlling for the effects of conservation had little effect on the relationship between linguistic awareness and reading achievement. However, when the effects

of linguistic awareness were controlled, the correlations between conservation and reading achievement dropped. When both the "TLL" and the Sand were partialed out, the decoding and total reading correlations became insignificant.

The t-test results indicated that boys and girls tended to perform similarly on conservation, reading achievement, and linguistic awareness tasks. Significant differences did not surface between boys and girls on the CAK-C, Sand, "TLL," or the SAT-R.

Conclusions Relating to the Research Questions

The following conclusions were reached as a result of the study. The nature of the sample tested must be taken into consideration when generalizing the results. The children all attended schools identified as Title I. These schools have extra funding for educational programs to benefit students from low-income families. The limitations presented by the validity and reliability of the test instruments must be considered. Also, the ages of the children sometimes exceeded those for which the validity and reliability of the test instruments were established. However, within these noted restrictions, the following conclusions were drawn and discussed in terms of the five research questions analyzed in Chapter Four.

Research Question One

> Is there a relationship between the vocabulary, comprehension, decoding, and total reading score of third grade students and their level of linguistic awareness?

Research Question One was raised to determine a possible relationship between linguistic awareness and reading achievement, and

to see if confusion in the area of linguistic awareness was affecting reading achievement at the third grade level. Previous research has indicated that at the readiness level, children not having an understanding of print concepts experience difficulty learning to read. Pearson product-moment correlations were computed to determine the significance and strength of the relationship at the third grade level. Based on the analysis of the results, the following conclusions can be drawn.

The review of the literature and the results of the present study suggest linguistic awareness does have a significant effect on reading achievement. This effect even continues until the third grade level. The highest correlations occurred between the decoding score and the Sand. This high correlation indicates that children having sufficient knowledge of print concepts and having made the connection between oral language and written representations also have acquired the necessary decoding skills for successful reading achievement. The best explanation for this seems to be that children picking up print concepts and reading terminology are also receptive to making sense of sound-symbol relationships.

The relationship between reading achievement and the Sand was generally stronger than reading achievement and the "TLL." The Sand required knowledge of spelling, reversals in letter order, and reversals in word order along with word reading and terminology such as beginning and ending sound. Children would need to be aware of the sound-symbol relationships in addition to reading terminology. It appears that the Sand goes beyond knowledge questioned on the "TLL." The exception to this was the vocabulary score. The relationship between vocabulary

and the "TLL" was .530, while it was .468 with the Sand. The vocabulary subtest of the SAT-R was designed to give an indication of the student's language background and knowledge of words likely to be encountered during school activities. The words were dictated and independent of children's reading ability. Students were asked to find the word printed in their test booklet to complete a sentence read by the examiner such as: "A baby cat is a--puppy, kitten, cub." The three choices were read in the same order they were printed in the test booklet. The "TLL" required children to recognize representations of words, letters, sounds, sentences, and punctuation, but did not require reading ability. Children who have knowledge of linguistic awareness terminology also have adequate vocabulary for successful reading achievement. This seems plausible in that children with better vocabularies have theoretically had more opportunity to hear and use terminology used in reading instruction.

Research Question Two

> Is there a relationship between the vocabulary, comprehension, decoding, and total reading score of third grade students and their conservation ability?

Research Question Two was raised to determine the relationship between cognitive development as measured by Piagetian conservation tasks and reading achievement. Again, Pearson product-moment correlations were used as the most effective means to analyze the relationship. Correlations between the CAK-C and SAT-R were significant and moderate. However, they tended to be weaker than between linguistic awareness and reading achievement.

The possibility exists that conservation, as measured by the CAK-C, is not a good indicator of cognitive development at the third

grade level. Piaget outlined numerous tasks and it is possible that others, or a combination, would be better indicators of cognitive development for third grade children. If this is the case, a higher correlation with reading achievement might have been attained with a better indicator. Also, it is possible that by third grade, when children are eight and nine years old, the transition to concrete operations is not as important for reading achievement as understanding reading terminology and printed language concepts.

The implications from the analysis of the first two research questions is that linguistic awareness has a stronger relationship to successful reading achievement than conservation. Knowledge of the terminology and concepts used in reading instruction was more important for third grade reading success than cognitive development as defined by Piagetian conservation tasks.

Research Question Three

Is there a relationship between conservation ability and the level of linguistic awareness?

The possibility of a relationship between linguistic awareness and cognitive development has just recently appeared in the literature. The linguistic awareness instruments used in this study were moderately correlated to each other indicating that they were measuring much the same thing but, as the results of Research Question One indicated, they each have their strongest relation with different aspects of reading achievement.

It can also be concluded from this analysis that linguistic awareness and cognitive development were significantly but not strongly correlated. This indicates that conservation and linguistic awareness

were overlapping, both measuring, in part, similar abilities. The lack of more overlap may have been due in part to the test instruments. Piaget outlined several kinds of tasks that indicated cognitive development levels. It may be that conservation is not a good measure of cognitive development at the third grade level. Also, it is possible that the importance of the shift from preoperational thinking to concrete operations for reading achievement may be occurring at an earlier age. The effect may be minimized by third grade. The linguistic awareness measures may need validation and standardization for third grade children.

Research Question Four

> Which is the best predictor of third grade reading achievement, linguistic awareness or cognitive development?

Research Question Four was raised from an instructional viewpoint. Given that linguistic awareness and cognitive development are somewhat related to reading achievement, having knowledge of a child's ability in which area is going to be more useful for determining reading success? The multiple regression analysis indicated that the best predictor of third grade reading achievement depended upon which aspect of reading achievement was being investigated. The analysis indicated that the Sand was the best predictor of reading achievement in every area except vocabulary. This was shown by the Pearson product-moment correlations for Research Questions One and Two. Language competence, which the vocabulary score was testing, was more related to the "TLL" than to the Sand. The Sand appears to be a broader-based instrument related more generally to the overall reading process, while the "TLL" is more terminology oriented. In every case, except vocabulary, the

"TLL" added little to the regression analysis. The Sand appears to be a more inclusive measure of linguistic awareness than the "TLL," while knowledge of the "TLL" terminology is more highly correlated to language competence.

In very case where the Sand, "TLL," and CAK-C were given, the CAK-C was the second best predictor of reading achievement. The additional information it provided did not greatly enlarge the correlation coefficient. Except for vocabulary performance, however, the CAK-C was a better predictor than the "TLL." This may have been because many of the concepts measured by the "TLL" were covered in the Sand, and therefore the "TLL" also added little new information to the regression equation.

The partial correlations added further to the knowledge of the effects of linguistic awareness and conservation on reading achievement. When the effects of the CAK-C were controlled, correlations between the SAT-R and the Sand and "TLL" remained significant at the .001 level. And, the strength of the correlations were weakened only slightly. However, with the effects of both linguistic awareness measures controlled, the predictive value of the CAK-C dropped significantly and, in the case of decoding and the total reading score, became insignificant.

The results of the multiple regression and partial correlation analyses lend credence to the conclusion that linguistic awareness knowledge has more of an impact on reading achievement than does cognitive development as measured by Piagetian conservation skills.

Research Question Five

Are there differences between boys and girls in their ability to conserve, linguistic awareness, and reading achievement?

Research Question Five was raised to investigate the possibility of a sex-related difference on the three independent variables. Since boys tend to be more often than girls identified as having reading difficulties, the possibility that girls differed from boys on these variables was explored. The t-test analysis revealed that there were no significant differences, therefore making it impossible to relate these variables to the differences often noted between the reading abilities of boys and girls.

Two conclusions can be drawn from this. One is the possibility that by third grade the differences between cognitive development and linguistic awareness skills have equalized between boys and girls, therefore making no significant differences between reading abilities at the third grade level. The other possibility is that linguistic awareness and cognitive development are not at any time related to the differences between the reading abilities of boys and girls. As a result of this study, it is not possible to take either position.

Educational Recommendations

Since the study of linguistic awareness is a relatively recent endeavor, further research will be needed to validate the findings and conclusions drawn in this study. However, these preliminary findings lead to several implications for education. The relationship of the Piagetian tasks to reading achievement also have educational ramifications.

A holistic approach to reading instruction received support. Children need to be taught reading in a setting in which they learn the communicative aspects of reading and in which they learn the relationship between oral and written language. The higher correlation between decoding and linguistic awareness showed that learning decoding skills is also helping children acquire the needed linguistic awareness terminology and concepts.

Early childhood educators should be consciously emphasizing linguistic awareness concepts during the early primary grades. Children are reaching third grade without a good background knowledge of linguistic awareness terminology. Teachers working with children during the initial stages of the learning-to-read process can not assume that children understand the terminology and concepts they are using when talking about reading. Children need more examples and explanations of the terminology and concepts. This needs to be done, not as a separate, isolated activity, but as an integrated part of oral language activities.

Remedial readers should be screened on a linguistic awareness instrument to determine if they have acquired the necessary terminology and concepts. The conclusions drawn in the study indicate that the Sand would be more useful than the "TLL." If children have not acquired the necessary linguistic awareness skills, extra emphasis should be incorporated into the reading instruction these students are receiving.

Although the results of this study do not support a cause-effect relationship between the expansion of linguistic awareness skills and cognitive development as measured by conservation tasks, the possibility that emphasis on language skills might in some way contribute to accelerated cognitive development can not be dismissed. In any event,

time spent helping children acquire oral language skills would almost certainly facilitate their subsequent acquisition of written language.

Suggestions for Further Research

The following recommendations were made to extend the research presented here. Several relationships need further clarification and the questions raised here need further exploration.

First, a more comprehensive instrument based on Piagetian tasks to assess cognitive development needs to be designed, tested, and standardized. The CAK-C tested conservation skills, which is only one aspect of the range of concepts Piaget found to be influenced by the cognitive developmental level of the individual.

Second, children from a broader range of ages need to be studied. Are the effects the same at the first and second grade levels? What is the relationship between conservation and reading achievement at these ages? What about linguistic awareness?

Third, since only one of the three subtests of the Linguistic Awareness in Reading Readiness Test was given, it would broaden understanding in terms of the link between linguistic awareness and reading achievement to give children the entire test in addition to the Sand, particularly since the "TLL" and the Sand each had their highest correlation with different aspects of reading achievement.

Fourth, differences between groups of good readers and poor readers at different age levels would clarify and enhance knowledge as to the effects of linguistic awareness and conservation on reading achievement.

Fifth, conduct a study in which one group of children is given additional emphasis on linguistic awareness concepts and terminology, and compare their reading achievement to those who do not get the added emphasis.

Sixth, children from other socioeconomic areas need to be studied to extend the generalizability of the findings here. Do other children respond similarly? The children in this study attended a Title I school. The question arises as to how they might be similar or different in terms of linguistic awareness with respect to children in schools not identified as Title I.

The above-mentioned recommendations for further research would extend the existing knowledge about linguistic awareness and cognitive development and their relationship to reading achievement.

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