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ENGAGED IN READING AND WRITING ACTIVITIES.

The Ohio State University, Ph.D., 1974
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THE RANGE OF OPERATIVE STRUCTURES
UNDERLYING THE BEHAVIOR OF YOUNG
READERS AND NON-READERS ENGAGED
IN READING AND WRITING ACTIVITIES

DISSERTATION

Presented in Partial Fulfillment
of the Requirements for the Degree Doctor of Philosophy
in the Graduate School of the Ohio State University

By
Moira Gwendoline McKenzie

* * * * *

The Ohio State University

1974

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   the Informal Classroom." Theory Into Practice, Vol. XIII, No. 2,
   April, 1974, 107-111.

With Wendla Kernig, The Challenge of Informal Education. London:
   Darton, Longman and Todd (in press).
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CHAPTER 1

Introduction

Background for the Study

Cultural Pressure to Read

The problems of universal literacy engage the minds of educationists and sociologists throughout the world. As more societies become urbanized and industry more technological, education generally, and literacy in particular, become indispensable for economic survival. Miller (1972) pinpoints this when he says that "our technical progress is creating a socio-economic system in which the ignorant, illiterate individual is useless and barely tolerated at a level of existence we call 'welfare'." The need for an educated, literate society is recognized and pressure is put upon schools to pay attention to the fact that opportunities for the illiterate to lead any kind of fulfilling life and contribute to society are decreasing. It is a sad fact that poverty and illiteracy are inextricably linked in western society.

Education, therefore, is becoming increasingly necessary for economic survival, and literacy is central to education. The schools spend a great deal of time and effort in the teaching of reading and yet many children, particularly from under-privileged sections of society leave school either illiterate, or barely functionally literate. This is, of course, a serious indictment of the reading instruction given to these children and it leads to pressure on the
schools to do better. Unfortunately, this pressure has, in many instances, forced reading instruction to begin at a time when children have no interest in reading, per se, and to proceed in a way that has little bearing on children's existing conceptual development and approach to learning.

Downing (1973, p. 114) reports a survey of the National Education Association which found evidence of more reading instruction in the public school kindergartens in the United States. In spite of this trend Downing comments that emphasis on earlier reading instruction has no backing from research evidence and can only be attributed to pressure concerned with "cultural motivation." The reality of this pressure is apparent in his forceable statement,

The aggressive urgency of the increased demands on younger children in the United States is a phenomenon that suggests some traumatic experience on the cultural scale (p. 115).

The "traumatic experience" may be related to the awareness of the consequences of illiteracy, discussed by Miller, or the possibility put forward by Downing of the need to maintain national superiority in the "space age."

The Impact of Early Reading Instruction on Children

Pressure towards early reading means in effect, that young children entering school today are immediately faced with the tasks of learning to read and write, taught as if these skills were ends in themselves. Furth (1970) is emphatic that although the ability to read well and use reading is more than necessary for expanding a mature intelligence; for a young child, the early pressure, the inordinate amount of time spent, not only contributes little to
In intellectual growth, but in many cases, actually interferes with it. He maintains that instead of searching continually for new methods of teaching reading, educators should be questioning whether reading, per se, is more valuable in these early stages than challenging and nurturing the growing intelligence of the child (p. 2).

Furth deplores the fact that much of a young child's energy is diverted to learning to read, at a time when he often sees little purpose and so has no intrinsic motivation. He maintains that historically, schools have ignored the highly motivated needs of the young child to explore and grow intellectually, and put learning to read in its place. He is emphatic that reading is not an intellectually difficult skill, that a mental age of 4 years is ample as far as I.Q. is concerned. If a child is highly motivated he will succeed.

Furth, a scholar drawing from a Piagetian frame of reference, is concerned about children's cognitive growth and maintains that the main emphasis in educating children should be to encourage highly motivated operative thinking, not figurative, rote learning, that he perceives much reading instruction to be. He is concerned that children spend too much time engaged in figurative and low-level operative activities. Piaget distinguishes figurative and operative knowing as two aspects of the known object. Figurative knowing focuses on the static, configuration of given things, the material aspect. Operative knowing "acts" on, transforms, given data in order to assimilate it to present schemes, i.e., to available generalizing structures. For example, symbolic behavior has a material (figurative) aspect and a meaning (operative) aspect. Understanding or knowing
can take place at a figurative level or at an operative level. Since symbols always have meaning, they are recognized in relation to the operative structures, or schemes, brought by the individual. The operative structures remain low level unless the organisms act on the perceived information and transforms it into schemes. When much of the learning is "other" rather than "inner" directed, the child's opportunity to operate on data is inhibited and he is prevented from extending his generalizing structures, the schemes that allow for assimilation.

If the figurative material, i.e., the written form of language is made accessible to the child in a way he is able to assimilate, he can - given time and appropriate feedback - spontaneously arrive at the coding rules. He does not have to spend his energy trying to remember rules and so is in a better position to enjoy and respond to the content of reading. Furth envisages a school system where there would be no pressure towards early reading for any child but that from the beginning of the elementary school, children would be consistently encouraged to apply high level operative thinking to ordinary activities and problems that are relevant to themselves and from which the need and purpose for reading and writing would be likely to arise.

Furth is convinced that in the early years in school, the long term development of children is better served if they are engaged in activities that demand some degree of high level operative thought, in order to maintain and develop intellectual curiosity. During these early years the stable concepts of time, space, relations and
classes are developing in the child and he is building the bases on which the learning of any special knowledge must rest.

Developing this high level operative thinking is inhibited in a school situation where the emphasis is on rote and descriptive learning.

Learning is inhibited both by the restricted skill-oriented nature of the reading instruction and the stranglehold teachers allow it to have on the rest of the curriculum. Their time and their energy too, are expended on explicit reading instruction, teaching every possible rule to the extent that learning becomes increasingly narrow and specific.

Morris (1973) is concerned lest poor teaching at the beginning of learning to read should adversely affect long term attitudes towards reading and the child's first impressions both of learning and of himself as a learner. He reminds us that "learning to read ... is not merely a skill and activity in its own right ... it is also one of the most important challenges to intellectual adventure and scholastic endeavor, that the school can offer the child [p. 27]." It affects attitudes to education and learning and it gives the child information about himself as a learner, particularly as a "book learner."

Morris (p. 28) describes how early education can affect the learner, by determining rigidity or flexibility as a mode of mental response. The quality inherent in this early period of education has many "side effects" of learning more important than what is measurable on a standardized test. Morris, cognizant of the importance of flexibility in initial learning, says,

The best educated are seen to be those who have developed to the maximum of their ability not only
to learn an appropriate response at one time of life but also to learn it in such a way that it does not interfere with the acquisition of other more complicated responses at a later stage (p. 28).

It would seem from the number of apathetic, intellectually disinterested older children in our schools, children who can read, but do not read, that there have been vital shortcomings in the way our young children have learned what learning is about. Merritt (1970) criticizes teachers of young children, "who are so insulated from the consequences of their failures;" who are "so far removed from the 'bother boy' whom she helped to produce [p. 8]." He berates the fact that teachers are content to be teachers of skills, and says,

... if we wish to develop an overall competence in reading we must develop reading in the context of those needs which are immediately significant to the child and which will be significant to him as an adult ... Teach reading in the content fields ... a need content, not merely a subject content (p. 12).

Merritt's structures are another indication that the quality of life and learning available in our schools is not meeting the needs of many of our young children.

Concern for Optimal Time for Instruction

Others have been concerned about this problem of concentrating on reading during the first years in school to the neglect of other kinds of learning. Dewey (1898) thought eight years early enough "for anything more than an incidental attention to visual and written language form." The concept of reading readiness evolved from such thinking and exerted a strong influence towards initiating a preparatory period in early education. Morphett & Washburne (1931), Gates (1937), and Schonell (1961), among others suggested that a
mental age of six and one-half years was optimal for beginning to learn to read. Gates drew attention to the fact that such arbitrary statements were useless without knowing what was meant by reading and the methods of instruction in use.

There is evidence that the kind of school with a broader curriculum in which learning and thinking are considered the most fundamental factors do, in fact, exist (S. Isaacs, 1932; Gardner, 1948). Reading attainment in these situations was found to be at least as good as in more traditional schools, while attitudes to learning and use of books was considered superior. So, emphasis on intellectual development in no way inhibits learning to read; in fact, it ensures that motivation and attitudes provide the necessary dynamic. Clark (1973) comments that inability to read by seven years old only becomes a disaster because schools make it so as a result of their particular approach to education, and their failure to cater for individual needs.

As recently as 1973, Briggs and Elkind, interpreted the results of their studies as "supporting the proposition that learning to read English is facilitated by possession of what Piaget calls concrete operations [p. 279]." Also in 1974, Biemiller presented a major research hypothesis in this way, "That the age at which children become ready to learn to read adequately within the course of one to two years varies from four to ten." This is a wide enough range to meet the needs of all kinds of children.

Durkin (1968) thought there was too much emphasis on trying to find an optimal time to begin reading, when the real problem should
be how to begin. This is more in keeping with Almy (1964) who makes the point,

The challenge to education ... will demand teachers who are well informed and thoughtful and who understand as much about the ways children think as they do about the subjects they teach (p. 12).

The present investigation of early reading in schools was not concerned with the concept of readiness as a way of deciding a starting point, nor with separate factors in reading. Based upon Piagetian concepts of development, it was concerned with understanding and applying this theory to children's learning and understanding the types of mental structures available to them and how these structures influence and direct further learning. It was concerned with investigating learning-to-read as an integrated process, provoking a child to use his own growing intelligence to create his own schemes.

**Distortion From Isolating Factors**

Although a great deal of research into reading has been undertaken, much of it, as Goodacre (1971) says, has concentrated on "how adults believe children learn to read" and on the various methods of teaching reading which reflect adult ways of learning rather than children's patterns of learning. Much reading research has centered on single factors, e.g., studies in perception, eye movement, short term memory. Some reading research has been made up of experimental studies, often concerned with small and isolated segments of reading behavior conducted in the laboratory rather than the classroom.

Moffett, (1968) discussing ways of learning to write, noted that "scientists have long been aware that when you isolate out a component for focused observation, you are changing it [p. 206]." This has
been the case in much of reading research and Reid (1973, p. 29) drew attention to the fact that there have been relatively few attempts to produce a coherent and unified account of what goes on when a child is learning to become literate. Mackay, et. al., (1970, p. 79) proposed that the absence of a theory of literacy is related to the dominance of reading research and reading theory in the twentieth century by psychologists. Researchers failed to take into account that reading and writing are kinds of language learnings and a part of learning that takes place in a social and cultural environment.

Mackay (1973) defined a theory of literacy as "a study of both reading and writing and the way in which the literacy learner extends his 'linguistic profile' from his use of the spoken language to embrace the use of written language [p. 9]." He emphasizes the multidisciplinary aspect of studying the learner as a psychological and social being. Mackay expressed surprise at the way many reading researchers and reading teachers pay no attention to the importance of a child's "linguistic profile" as a basis for further learning. Smith (1971) echoes this in his observation,

Two things are perhaps surprising about the skills and knowledge a child brings with him when he is about to read: the sheer quantity and complexity of his ability and the small credit he is usually given (p. 223).

Much education continues to be prescriptive and "applied" from outside, rather than based on the child's existing knowledge and interests.
Integration of Factors in Research of the 1960's

During the 1960's, there was a shift in research to the language base of reading and writing brought about partly through the work of psycholinguists, e.g., K. Goodman and F. Smith, and partly through studies of the effects of subcultures by sociologists, as in the work of Bernstein and Shuy. There have been many studies of visual perception of material which are concerned with the integration by the subject of visual perceptual skills and linguistic skills, e.g., Gibson, et. al. (1962, 1963), Epstein (1961), Merritt (1968). Other relevant studies have been concerned with children's reading errors or "miscues" as Goodman calls them, notably by Goodman (1967), Clay (1969), Weber (1970) and Biemiller (1970). All of these studies concentrated on the degree to which children's use of their oral competence is reflected in their early reading behavior. These four studies, too, give evidence of other learning behaviors. Goodman showed that children tend to rearrange language they are reading to conform to their own speech patterns, so that even early reading is not a matter of sequential processing but a "psycholinguistic guessing game." Clay's study was concerned with self-correction of reading errors, the ability of successful early readers to recognize dissonance and attempt to correct it. Weber, also studying reading errors, recognized a progressive refinement of strategies in using various semantic and syntactic sources of information and greater use of context. Biemiller recognized stages in the process of integration of knowledge of word analysis, with awareness of syntax and meaning. He noted the integration of skills used as the child attempted to use more than one kind of information.
In these four studies early readers were using prediction rather than decoding words. Beimiller and Clay showed evidence of the development of intermediate skills to increase accurate prediction, to use redundancy in the language and so reduce uncertainty. An integration of knowledge of language, of response to the meaning of the content, had been brought about gradually by the cognitive skills of the reader.

**Reading: A Complex Process**

The complexity of reading was recognized in M.D. Vernon's (1971) description of reading as:

1) An activity which varies considerably in nature according to the degree of proficiency with which it is performed.
2) The psychological processes involved are numerous and complex, and vary at different stages in learning to read.
3) The various processes must be adequately integrated together if reading is to become efficient and fluent (p. 4).

Vernon's definition recognizes that reading is not a collection of isolated skills but a cognitive fusion of many different kinds of learning. Although the process is complex, many children learn to read at a very early age (Durkin 1966, Clark 1973, Torry 1969) and with the same apparent intuitive ease as learning to talk. This supports Furth's statement that learning to read is not an intellectually difficult skill. Perhaps pertinent here is Moffett's (1968) statement that "both reading and writing are at once shallow mechanical activities and deep operations of mind and spirit [p. 15]." Since so many children learn to read with real facility, the question might be asked about what happens to many other children that makes learning to read so difficult. An intriguing question is whether the reading
ability of the young intuitive reader is qualitatively different from that of the child reading at the end of the pre-operational period of development who has been taught to read in school.

When learning to read is viewed in the context of learning generally, the learner organizes new information in the light of his previous knowledge and understandings, or his knowing schemes (Inhelder & Piaget 1964, Furth 1970). These schemes are inherent in his present understanding of the concepts involved in acquiring and using abilities in literacy. Specifically, these concepts include an understanding of the function of the written form of language; viz., that

1) written language has a response factor, at all levels of learning,
2) the meaning of spoken language is represented by visual signs,
3) written language is represented by combinations of a limited number of visual symbols and rules determine the ways in which these symbols are combined.

In learning to read F. Smith (1971, p. 226) considered the essential elements of reading to be

1) learning the distinctive features of written material, the significant differences by which alternative letters, words and meanings can be differentiated.
2) establishing his "categories" for letter and word identification and establish all the visual-semantic associations required for comprehension.
3) learning how the rules of syntax are related to the written aspect of language.
All of these elements demand more than perception and memorization of visual and auditory stimuli. Learning to read involves applying general intellectual abilities to the task. Perceptions need to be classified and the relations between classes understood. Neisser (1967, p. 95) pointed out "the unmistakable difference between 'seeing' that two things look similar and 'judging' that they belong in the same category." Bruner (1956) states that

To categorize is to render discriminably different things equivalent, to group the objects and events and people around us into classes, and to respond to them, in terms of their class memberships rather than their uniqueness (p. 1).

In understanding reading, the categorization of graphic representation, the association of equivalent grapheme-phoneme classes require the conceptual ability to form logical classes according to perceptual and functional similarity and differences. This ability to categorize involves abstraction, a process Vygotsky (1962) concluded was a stumbling block to young readers. Reid (1966) and Downing (1970) found that young children had a special difficulty in understanding abstract terms, i.e., words used in describing parts of language such as letter, word, and sentence. Concepts such as these can only be constructed by the child himself. In this regard, Vygotsky (1962) stated,

Direct teaching of concepts is impossible and fruitless. A teacher who tries to do this accomplishes nothing but empty verbalism and parrot-like repetition of words by the child, simulating a knowledge of the corresponding concepts but actually covering up a vacuum (p. 83).

In their study of the development of logical thinking, Inhelder & Piaget (1964) have shown that younger children are deficient in the
capacities of abstraction and generalization necessary for the conceptual grouping of objects into mutually exclusive categories. The ability to form logical classes, to construct hierarchies of classes and sub-classes, superordinates and subordinates is a characteristic of concrete-operational thinking which a child is likely to reach around seven or eight years (Inhelder & Piaget, 1964). Yet, it is known that many children, presumably in the pre-operational stage of thinking can read fluently.

**Implicit Learning and Explicit Instruction**

The question arises as to whether young, precocious readers actually have an explicit knowledge of logical classification and if this level of understanding is sufficient or necessary, in order to be able to read. Is it possible to acquire reading using abilities similar to those demonstrated by children in acquiring language? Pre-school children have acquired the basic structures of their language, in that they use them appropriately. They use basic sentence patterns and most transformations (Menyuk 1964, Slobin 1966). They have acquired the structures of their own particular dialect. They have acquired a rule-governed grammar, apparent in their language use, not by direct instruction, but "according to a paradigm or model they have unconsciously inferred for themselves [Moffett 1968, p. 190]." Moffett describes the ability to infer a generality from a wide range of instances "which also accounts for some children's learning to read and spell ... (as) a critical part of human learning." He summarized by stating
The learner's abstractive apparatus reduces a corpus of information, such as other people's sentences, to a usable rule. It is a data processing gift that enables us to learn something, but not how to do something (p. 190).

The necessary feedback has come about in the everyday social interaction between speaker and listener, each one of them concerned with communicating, with comprehending and meaning. Responses are real and pertinent to the communication, information is immediate to the situation at the optimal moment. In this immediate, personal situation, the child is best able to assimilate a wider range of examples to his developing schemes.

Bloom (1970, p. 222), discussing the "errors" children in her study made in their speech, concluded that they generally were systematic deviations from the model language. They did not occur by chance and they afforded glimpses of "productive patterns in underlying structure." It is these structures that enable the child to generalize rules, to create his own organizations, or schemes to which new information can be assimilated, against which new information can be tested. On the evidence of her study Bloom questioned the view that language development was the same innately pre-programmed behavior for all children. She suggested that the differences apparent in the way her subjects learned language "must reflect the importance of individual differences in the interaction between cognitive function and experience, which could not be assumed to be the same for any two children." In other words each child did his own learning in a personal idiosyncratic fashion.
Cazden (1972), discussing direct teaching of language in school, comments

An interesting paradox is posed.... There is general agreement that grammatical performance is based on grammatical knowledge, and simultaneous agreement that explicit teaching of that knowledge has no effect on that performance. However the initial acquisition of that knowledge takes place, teaching of it explicitly seems to put it in a form unusable to the learner.... We don't yet understand the relationship of what is in some sense 'learned' and what can in some sense, be taught (p. 241).

This notion that rules can be understood and used, only by those "possessing a good practical knowledge of the art" was discussed by Polanyi (1966, p. 31). He stated that rules only become important when they are seen by the user to contribute to the particular operation. They are not perceived as important in themselves. That it is possible for these rules to be part of tacit, unconscious knowledge is demonstrated in the communicative competence of young children.

This same competence underlies the way young children become precocious readers. Mountford (1970), cited in Downing (1973, p. 71) discussed the continuity of learning inherent in language learning and becoming literate. He points out that the acquisition of articulacy is also linguacy acquisition, a "once-for-all shift" from non-linguacy to linguacy. Literacy is an extension of linguacy; expression is in the medium of writing, as linguacy is expressed in speech. Mountford believes that when a language speaker learns a second language he is not beginning again but extending his existing literacy:

As literates in our first language of literacy, we are not, in learning to read a second language acquiring literacy over again, but extending our
existing literacy.... Literacy is acquired once-for-all, like linguacy itself (pp. 297-299).

The importance of paying attention to children's language and ways of learning is paramount in any study of children's literacy performance.

Statement of the Problem

The foregoing evidence implies that a dichotomy exists between societal needs for literacy and the negative effects on children's learning of over-emphasis on early reading instruction. The optimal time for instruction to begin appears to range between four and ten years with a consensus of opinion centered around six and one half years. There is growing evidence that over-concern about reading may actually interfere with both ability to achieve maturity in reading, and with intellectual and personal development. While appreciation of the role of tacit learning is recognized in relation to the way children acquire language, there is little understanding of the role it plays in becoming literate, a role well demonstrated by precocious, pre-school-instruction, readers.

Information from a wide range of disciplines provides evidence of the integrated, complex nature of the reading act and the distortion that ensues from instruction that is primarily concerned with isolating and teaching specific skills. A considerable body of evidence suggests that the established language competence and the constructive nature of cognitive development provide the basis for acquiring literacy and that the key to understanding reading lies in understanding these processes.
The Purpose of The Study

The purpose of this study was to investigate the young child's thinking processes as he engaged in activities concerned with reading and writing. The investigator focused on the subjects' performance and tried to determine the reasons, the organizational structures - or schemes - that underlay their performance and revealed their developing understanding of the writing system, the written form of language.

From the reading and writing behavior of these subjects the investigator probed the cognitive processes used in fusing information from linguistic, visual and contextual sources.

The status of each subject's acquisition of specific concepts related to the written form of language and his ability to state them explicitly was sought through performance tasks, questioning, and informal discussion.

Also, through discussion and probing questions the investigator sought information relative to each subject's affective and functional schemes relative to the purpose and value of reading.

While the research literature revealed investigations into pre-reading and the beginner's understanding of the nature of the reading task including certain basic literacy concepts, there was less evidence about children of similar age and experience who were precocious readers. Evidence existed to show that concrete-operational thinking was needed in order to understand complex literacy classes, such as 'word' and 'sentence.' However, less evidence was found as to whether learning to read could be successful with no more explicit understanding of such concepts than the young child has of the linguistic
concepts he employs in using oral language. The available evidence suggested that children come to a gradual awareness of concepts relating to written language in the course of learning to read and write.

The investigation was designed to probe into the status of such literacy concepts in young precocious readers who had not attended the first grade. Using mental age as a control, two additional groups of children were investigated. Both groups matched the precocious readers on range of mental age. The variable for one group of children, of comparable chronological age, was the inability to read. The variable for the third group was chronological age and first grade experience. They were one year older than the other two groups.

Thus, the researcher set out to investigate how children with similar mental ages conceived the nature of the reading task, and the status of their understanding of basic concepts relating to the written form of language.

Specifically, in this study data were collected and analyzed pertaining to the subjects:

1) attitudes and understanding of the purposes and functions of reading.
2) understanding of concepts related to, and the constraints inherent in, the written form of language, e.g., words, letters, punctuation, and phonology.
3) strategies used in early attempts of children to read and write.
4) performance on selected aspects of cognition; viz., class inclusion and logical addition.
5) strategies used in reading with regard to integrating information from grapho-phonemic, syntactical and semantic sources.

Evidence and insights gathered from the study of relevant literature provided a basis for examining data obtained from each subject, interviewed individually. The thinking being used by subjects as they were actually engaged in working on and discussing various literacy-related tasks and activities was probed and provided the data.

The Direction of the Study

Since the purpose of this study was to examine children's underlying thinking structures, to get beyond performance and probe into reasons for particular behavior, it did not lend itself to experimental research. Instead a series of interview and task performance sessions were held with each of the 21 subjects. Sessions were structured in terms of specific purposes; questions were prepared, and materials (books, pencil and paper and pictures) were available to be used freely or, at times, very specifically.

The number of interviews for each child varied in accordance with the time available, the rate of fatigue exhibited by the child, and the amount of response from the child. These interviews were recorded on audio-tape and transcribed by the investigator immediately, usually within 24 hours of the interview.

The researcher had a number of key questions prepared, but the phrasing and timing of the questions, and ensuing discussion was determined in the interview. The investigator was careful to pursue leads offered by the child engaged in the activity. This way of working is in the nature of clinical research as exemplified by
Piaget, in which words are viewed only as "a way to get the thinking going. There is no guarantee that the same words will cue in the same way for every child [Duckworth 1973, p. 27]." The aim of the interviewer is to link in to the point of the child's interest and attention and work from there. Piaget's point of view is that "standardizing the words has little to do with standardizing the problem.... Sticking rigidly to a fixed formula can almost guarantee a lack of standardization [Duckworth, p. 27]."

**Importance of the Study**

This investigation aimed to gather information from sources relevant to understanding children's move into becoming literate. Since a basic assumption was that literacy is a further development of linguacy, research from the field of psycholinguistics was investigated. The learning theory basic to this study recognizes the child as a constructive learner; hence, information from cognitive and developmental psychology was examined.

This study contributes to knowledge of children's thinking and learning about literacy as they become literate, in a way consonant with research needs expressed in the recent *Reading Research Quarterly*, 1973-74. The editors expressed the need for, "Observational studies, case reports of an intensive nature, historical research, depth interviews, Piaget-type experimentation, broadly based evaluation studies which may help us to understand the reading process more fully [The Summary]."
Definition of Terms

1. **Concrete operation** - Characteristic of the first stage of operational intelligence. A concrete operation implies underlying general systems or "groupings" such as classification, seriation, number. Its application is limited to objects considered as real (concrete) (Furth 1969, p. 260).

2. **Conservation** - The maintenance of a structure as invariant during physical changes of some aspects. The stability of an objective attribute is never simply given, it is constructed by the living organization. Conservation therefore implies an internal system or regulations that can compensate internally for external changes (Furth 1969, p. 260).

3. **Figurative knowledge** - knowledge that focuses on the external, figural aspect of an event in a static manner, closely tied to a particular accommodation as illustrated in perception, imitation, image, memory. Figurative knowledge is conceivable only within a framework of operative knowing (Furth, p. 261).

4. **Operativity** - Contrasted with figurative knowledge it implies the action of intelligence at all periods, including sensory-motor intelligence. Operativity is the essential, generalizable structuring aspect of intelligence insofar as knowing means constructing, transforming, incorporating, etc. (Furth, p. 263).

5. **Pre-operational** - Often used to designate the period after the sensory-motor stage but prior to the formation of the first operations in the strict sense. The pre-operational period is the preparatory part of the stage of concrete operational
intelligence, characterized by the deforming need for symbolic support, hence ego-centrism (Furth, p. 264).

6. Scheme - The internal general form of a specific knowing activity, frequently, but not exclusively, used for sensory-motor intelligence. The generalizable aspect of co-ordinating actions that can be applied to analogous situations. Operations are nothing but the most general schemes of operational intelligence (Furth, p. 264).

7. Miscue - any observed response that does not correspond to the expected response (what was printed in the text) when reading orally.

Scope and Limitations of the Study

Interpretations of the findings in this study should consider the scope of the investigation and certain other possible limiting factors identified in the study situations and procedures.

The number of subjects, twenty-one, was small and no attempt was made to select a representative sample. The limited sample was required if one investigator was to do all of the data collection. The data collection period was limited to two months; whereas, a longer period might have provided more interesting data about developing schemes within individuals.

No attempt was made to control variables known to have some significance for reading success, e.g., social class or school environment.

The research was done by one interviewer, who not only prepared and conducted the interviews, but was the only person engaged in the
arbitrary classification of data other than miscue data. The possible limitations of this factor were probably off-set by the consistency of procedures followed throughout the study and the competence of the investigator in communicating with young children.

Summary

The need for greater insight into the process of acquiring literacy is made increasingly critical as more and more pressures for children to read and for teachers to teach them is felt. Understanding has been hampered by the piecemeal nature of reading research and, also, by many of the assumptions on which much of it was based. The present investigation, based upon psycholinguistic concepts and Piagetian assumptions of cognitive development, was designed to probe into the process of acquiring literacy among young children.

The literature pertinent to the study is reviewed in Chapter II and the description of subjects and procedures follows in Chapter III. The data are presented in Chapter IV and Chapter V provides a summary of findings, conclusions, and recommendations.
CHAPTER II

Review of the Literature

Introduction

The controversy over how young children should be taught to read has continued over a long period of time. No area of the curriculum has been more consistently searched than reading. According to N.B. Smith (1965) the last fifty years have seen more innovations in beginning reading instruction and methods than the previous three hundred. Much of this has been related to experimental study, largely conducted in a laboratory and often concerned with isolated parts of reading behavior. Focusing on particular aspects (visual perception, short-term memory retention) and examining them minutely can, of course, provide valuable and specific information about reading behavior; however, it may provide little insight into the nature of the global act. Mackay et. al., (1970) put forward the notion that it is the long domination of the field of literacy research by experimental psychology with investigations centered on isolated factors, that has hindered the development of a coherent theory of literacy.

One of the major shifts in research into understanding reading in the past fifteen years is a new view of reading as a further development of language learning. The great upsurge of information from the linguists in relation to language acquisition and social factors in language variability has emphasized the central role of language in
learning. Interdisciplinary barriers have been breached as psycholinguistics, sociology, and information theory have brought new insights into learning to read. Reading specialists now have available a more embracing background of knowledge to bring to reading instruction. Cognitive and developmental psychologists are providing information that aids in understanding thinking processes used in learning and the dynamic role of the learner, himself.

The present investigation, through careful and informed observation, sought to probe into young children's behavior as they engaged in reading and writing behavior and to analyze these behaviors using information available from a variety of disciplines. To use Claparede's (1962) expression, the investigation sought "what is hidden behind the immediate appearance of things."

Literature relevant to the present investigation was drawn from several fields of study: developmental and cognitive psychology, epistemology, psycholinguistics and education. The study was based on and can be interpreted in the light of theoretical constructs and research evidence relevant to:

1) the complex nature of the reading process;
2) conceptions of learning as a constructive act, including a) the role of abstraction, b) concepts of figurative and operative knowing, and c) the distinction between implicit and explicit knowing;
3) the acquisition of language and its implications for learning, generally, and reading specifically;
4) the characteristics of the learning behaviors of early readers;

5) perceptual and conceptual aspects of the reading act; and

6) the acquisition of reading and concepts about reading.

Reading: A Complex Process and Constructive Act

Kolers (1970) wrote that "if anything is true of reading, it is that it is one of our most complex forms of information processing [p. 90]." Compounding the task for the beginner is the fact that he has very little notion either of what reading is or what is involved in learning to read (Reid 1966, Downing 1970). The learner's probing (reading) of the written form of language brings about an investigation of information and complex cognitive structuring, as he fuses visual and auditory perception with his present knowledge of language and general conceptual awareness. It is integrated, constructive action on the part of the reader.

Much reading research has centered on single aspects, e.g., studies in perception, eye movement or letter name knowledge. Scientists have long recognized that when a component of a whole is isolated for focused observation it is changed, and to some extent, takes on new characteristics. Yet, much of the existing knowledge of reading, that has so significantly influenced method, has come from this kind of investigation. Neisser (1966) draws attention to the differences inherent in the controlled behavior of experimental psychology and ordinary learning experiences. In a controlled situation "the constructive act is closely controlled by present or recent stimulus information [p. 305]." In a more normal situation, the learner's activity
and thinking is determined at every moment by what he is trying to do. He has many more alternatives open to him: he can ask a question, he can check back on past information, or he can pursue an idea that develops in connection with a particular thought or action. Neisser recognizes the function and value of experimentation, but questions whether the oversimplification that comes about when the subject is confined to a single motive and a fixed set of alternative responses, results in losing the essence of learning itself. Similarly, Vernon (1957), recognizes this complexity in learning when she sees the acquisition of reading as a cognitive fusion of many kinds of learning rather than the acquisition of a collection of skills. Hence, learning to read must be seen in a wider context with greater understanding of the child's part in bringing about his own learning, as he organizes new information in the light of his previous understandings, or his knowing schemes (Inhelder & Piaget, 1964).

**Learning: A Constructive Act**

**Piagetian Concept of Developing Schemes**

The Piagetian viewpoint is that each one of us constructs his own mind, his own learning, and that this learning has its origins in the reflexes present at birth. The sucking reflex, for example, is applied to any object that touches the baby's mouth. The baby begins to differentiate variations in sucking, e.g., sucking in order to obtain food and other sucking; and so establishes relations between similar or differentiated objects determined by his own actions. The structure common to all of the baby's action in relation to sucking in this early sensori-motor stage Piaget calls a **scheme** (e.g., of sucking) an action
scheme. The scheme grows as new situations are assimilated and accommodations are made to new situations.

At a later stage the child may have a scheme for dog that relates only to the family dog and, perhaps, to the dog next door. He assimilates any examples he sees of "dogginess" to his dog scheme, not always correctly. For example, a small child seeing a horse for the first time, may well describe it as a "big dog" because the features he notices "fit" his scheme of "dog." When he realizes that this animal does not fit his present scheme he makes an accommodation, he adapts his knowing structures, and a new scheme is formed. Every scheme is the result of an assimilative activity. Its function is to incorporate the new to what is already familiar and to make generalizations. As Furth (1969) put it, "Schemes are the structural results of the functioning of assimilation."

**Figurative and Operative Knowing**

Piaget asserts that all "knowing" has two related aspects: figurative and operative. A three year old and a ten year old will "know" an airplane flying overhead in very different ways. The younger child will see a plane and recognize it from its contours and the noise it makes. The older child will see a DC 10 coming from the east preparing to land at the city airport. His scheme of knowing is more elaborate; it is based on more operative knowing. Another example is that of four year old John who can recognize that J is what his name begins with. He knows J in a totally different way from someone who knows J within a class known as "letters." John can know the sound J makes, at the beginning of John and just "know" this as another
name for J. This again is a different kind of knowing from understanding sound-symbol relationships. The figural aspect of J is static. The operative aspect of knowing is directly related to the operative structures. John's knowledge and understanding of J will change, not because the figural aspects of J will change, but because his underlying operative structures will have changed. This operative knowing is brought about through the transforming action of the individual.

Figurative and operative knowing are distinguished in terms of hierarchial structures. The child who can discriminate that "cow" is different from "dog" accommodates to new information, but his knowledge of cow may be limited to perceptions of particular cows (for example, the one he sees in a nearby field, or the black cow); it is not yet a scheme because it has no generalizing assimilative function. It remains largely figurative because it focuses on the static configuration, the material aspect. Operative knowing "acts on" transforms, given data in order to assimilate it to present schemes, or accommodate to form new schemes which will become part of a system of classes. "A scheme is inherently linked to other schemes in hierarchial divisions and sub-divisions of generality [Furth 1969, p. 157]."

Piaget (1962) distinguishes between schemes or concepts and the preconcept which involves the image, and thus, is heavily dependent on the figurative aspect and is not a true concept. In the case of the preconcept, there is assimilation to a particular object without generalized accommodation to others. In the child between four and eight years there is a gradual shift towards the operational concept "through the construction of a hierarchy of nestings, by means of
which assimilation becomes mediate and generality is gradually achieved [p. 229]." Piaget refers to "articulated intuitions" that develop during this period and are still linked with the figural but are becoming increasingly logical within this restricted field.

During this period the child's thought is described as transductive, that is, he makes inferences that "proceed neither from the particular to the general, nor from the general to the particular, but from the particular to the particular [Stern, cited by Piaget, 1962, p. 234]." In Piaget's terms, transductive reasoning lacks the reversible nestings of a hierarchy of classes and relations. It is hindered by the young child's tendency to center on particular aspects of a situation.

Transductive thinking is distorting and irreversible in so far as it is centered; gradual decentration will make for greater logic and give rise to a hierarchy of nestings and reciprocities.

Evidence of Figurative and Operative Learning in Recent Studies

Although the investigators did not interpret them in this way, evidence of figurative and operative knowing are apparent in Reid's (1966) study, replicated by Downing (1970) as they interviewed five year old children to determine the notions that they brought to the task of learning to read and write. They found that some children when presented with books "were not even clear whether one 'read' the pictures or the other 'marks' on the page [Reid, p. 61]." Some children had become aware of "a set of shapes (with, perhaps, mysterious names like "h" for house) [p. 58]." Others were trying to find a general name for the shapes they were vaguely aware of and called
them all "numbers." Reid considered them as exhibiting certain linguistic and conceptual uncertainties about the nature of written language. The figurative aspect of their knowing is apparent. The operative aspect of their knowing is meagre but it is there, for even at this early stage there is some recognition that to "write" is to produce these symbolic forms, as distinct from drawing. By the end of the year of her study, Reid found evidence of growth in the children's understanding. She found that "... the children groped towards the necessary ordering elements at varying speeds, and with varying degrees of success [p. 61]." Their knowing was based on higher operative structures as they assimilated new learning to existing schemes and made new generalizations.

The notion of assimilation in learning is apparent in Clark's (1971) investigation of the child's acquisition of semantics. "The Semantic Feature Hypothesis proposes that when a child first begins to use identifiable words he only has partial entries for them in his lexicon [p. 132]." He adds more and more features until he understands a word as fully as an adult. He acquires first, the more positive aspects of comparisons; that is, he understands "more" before "less"; "high" before "low." Where words share a number of semantic features in common, e.g., "brother" and "boy" the child confuses the specific term "brother" with the general term "boy." Clark found that if the features which combined to make up the meaning of a word are related hierarchically, then the order of acquisition is "top down." The features "have to be 'learnt' in the acquisition of the word itself" as the child differentiates and abstracts more and more properties [p. 18].
Abstraction in Learning

The Piagetian View

Furth (1969, p. 60) explicating intellectual knowledge as creative activity, contrasts the knowledge an infant has of a ball with the way an adult responds to a ball as a known object. The infant's knowledge is simply a "practical" knowledge, but the adult has assimilated it to existing operational structures. "Thus, ball, known as an object carries with it an implicit functional potential, e.g., something that can be rolled, thrown, punctured, kicked, dropped, bounced, hidden, but not poured, eaten, twisted, etc. [p. 61]." Both the adult and the baby have abstracted particular attributes of the ball but obviously at different levels of abstraction.

Kinds of Abstraction. Piaget distinguishes two kinds of experiences or abstractions: a physical or simple abstraction, that abstracts physical things such as color, texture, weight, shape, etc.; and a logico-mathematical or reflecting experience that abstracts from the knowing activity itself. In logico-mathematical abstraction, what is abstracted is not observable because the child constructs the introduces relationships himself. The relationship does not exist for the knower until he makes it. For example, the relationship "X is bigger than Y" is not to be found in X or in Y, but only when the two objects are put into a relationship (Furth 1969, p. 65).

Piaget uses the term "reflecting" abstraction to indicate that the feedback comes from the coordinated relationships themselves. Furth states this Piagetian view as follows: "The abstraction, as a feedback, is an internal regulatory mechanism; and as an internal
enrichment, it becomes the principle source of growth of the operative structure (Furth, p. 65)." Piaget, in Structuralism (1971), puts the dynamic aspect of learning in this way:

But this is not the end of the story. A new set of reflective abstractions leads to the construction of new operations upon the preceding, though nothing new is added, except again, a reorganization.... (p. 66).

**Class Inclusion.** In a class inclusion task, for example where the child is shown a collection containing nine brown beads and five white beads, he can clearly see there are two groups of beads. For him to know whether there are more brown beads or more wooden beads, he needs to go beyond the immediately observable and construct the classes and quantitative relationships involved. It is not possible to teach this directly because it must be constructed out of relationships created by himself. He creates subsequent relationships from those previously created by himself. He abstracts physically from the collection of beads to construct subcollections. The construction of the quantitative relationships involves logico-mathematical abstraction which involves the constructs of class and number. Piaget suggests that operational schemes derive principally from logico-mathematical abstraction (Inhelder & Piaget, 1964).

Bruner (1961), also, recognizes the constructive role in learning in his explications of discovery learning. He said,

... one can cite a myriad of findings to indicate that any organization of information that reduces the aggregate of complexity of material by embedding it into a cognitive structure a person has constructed, will make that material more accessible for retrieval. ... emphasis on discovery in learning--has the effect upon the learner of leading him to be a constructionist--indeed of learning how to go about the very task of learning (p. 163).
In discussing the construct of abstraction in his studies on categorization, Bruner (1956, p. 9) differentiates between perceptual and conceptual categorization. He described the act of identification as involving a "fit" between the properties of the input and the specifications of a category. The principle difference between perceptual and conceptual forms of categorization is "the immediacy to experience of the attributes by which their fitness to a category is determined." Conceptual categorization, in common with Piaget's logico-mathematical abstraction, requires going beyond the observable.

Neisser (1966, p. 95) makes a similar distinction when he emphasizes the unmistakable difference between "seeing" that two things look similar and judging that they belong in the same category.

Cognitive Structuring and Learning to Read

In order to understand reading, the categorization of graphic representation, the association of equivalent grapheme-phoneme classes, require the conceptual ability to form logical classes according to perceptual and functional similarity and differences. This ability to form classes involves conceptual abstraction, a process Vygotsky (1962) concluded was a stumbling block to young readers generally. To construct such concepts consciously, the child would need high level operative structures. Inhelder & Piaget, (1964) concluded that:

Younger children are deficient in the capacities of abstraction and generalization necessary for the conceptual grouping of objects, that is to say, grouping similar objects into mutually exclusive categories.

Inhelder & Piaget's (1964) position is that children with cognitive structures sufficiently developed to form logical classes, hierarchies
of classes and sub-classes, superordinates and subordinates are already in the concrete operational stage of thinking. Yet research has shown that some children, presumably in the pre-operational stage, can read fluently (Torry, 1973).

**Early Reading and Conservation**

In a recent study by Briggs & Elkind (1973) sixteen matched pairs of five year old readers and non-readers were given a battery of perceptual, motor, cognitive and personality tests. Factorial and discriminant analysis of the scores indicated that only in their performance of an "operativity" factor which consisted of some Piagetian conservation tasks and reflection-impulsivity measure were the early readers significantly superior to the non-readers. Briggs & Elkind interpreted their results as support for the hypothesis that learning to read English presupposes certain logical structures that "allow children to grasp the complex encoding and decoding rules which link graphemes and phonemes in standard English [p. 280]." In a recent paper Elkind (1974) identified as a basic error in early reading instruction the failure of adults to understand the difficulty children have in understanding the concept of the letter, which he describes as, "in many ways, the basic 'unit of reading' [p. 3]." He described grasping the concept of letters as being akin to difficulties met in understanding numbers. He stated,

Like numbers, letters have an ordinal property which is their position in the alphabet. And letters also have a cardinal property—their name (A, B, C, etc.)—they also have phonetic contextual properties. These findings are consistent with the view that the letter is a complex logical construction that requires concrete operations for its full elaboration (p. 3).
The key word in Elkind's statement is "full." Whether or not learning to read requires a full understanding of linguistic concepts such as this is still open to conjecture. There are many researchers who would challenge the notion that the letter is the basic "unit" of beginning reading (Kolers, 1970; Goodman, 1972; F. Smith, 1971).

**Explicit Knowing of Literacy Concepts as a Requisite for Reading**

A great distance exists between young learners' low-level operative knowing of the concept "letter" and the full understanding as outlined by Elkind above. Evidence provided by Reid (1966) showed that beginning readers are confused about such concepts and results of Clay's (1969) research revealed that these concepts begin to clarify during the process of learning to read, as operative knowing increases. There appears to be no evidence of the level of development of literacy concepts in the precocious reader, or the young reader of 6 to 7 years. Vernon (1971) stated

"... the young child has to realize that the shapes and sounds of letters and words possess certain essential features which do vary according to context, but in a lawful manner, and these he must learn to recognize. At the same time, he must ignore certain other irrelevant variable characteristics (p. 79)."

Vernon does not make clear, however, whether this understanding is acquired tacitly, or if the young child needs this knowledge explicitly. She expressed doubt, however, as to "... whether young children possess the conceptual ability to grasp and operate rules ... [of spelling] ... except perhaps of a very simple kind [p. 81]."

Vernon (1971) concluded that the relationship of reading to intellectual abilities is not fully understood and more investigation
is needed to clarify what particular types of intelligence are needed for learning to read.

The kind of intelligence needed for learning to read given present methods of instruction, may well require the kind of logical thinking Elkind refers to as concrete operational structures. This would also explain how a consensus of opinion was arrived at by so many early researchers that the optimal time to begin reading instruction was around 6½ years (Morphett & Washburne, 1931; Schonell, 1942). Gates (1937), however, recognized the meaningless of setting an arbitrary age without relating it to the type of reading instruction. Durkin (1968) concurred with this view when she commented that a great deal more thought had been given to when instruction should take place than to other basic questions, such as how.

Durkin (1970), criticized the serious flaw she discerned in readiness research. She referred to "... its unfortunate tendency over the years to present correlation data as if they indicated cause-effect relationships... and to omit attention to possible reasons for the reported correlations [p. 189]." Durkin singled out particularly the use of studies that show a significant correlation between letter-naming ability and later achievement in reading. The likelihood is overlooked she says, "that the research measured an ability that was one product of an out-of-school environment that will always contribute to the child's success in school [p. 189]."

Early Readers and Learning to Read

Studies of early readers and experiments in teaching reading to children prior to first grade provide data about the characteristics
of early readers, e.g., intellectual, socio-economic, and family relationships. They also give insight into (1) who initiates the learning-to-read, child or adult, and (2) the context in which reading occurs including the source and nature of the stimulus.

Studies report variability in mental age requirements for reading. Fowler (1971) summarized relevant reading studies and suggested that a mental level of 4 years appeared to be prerequisite for success in reading. Furth (1970), too, is emphatic that a mental age of 4 is sufficient. However, studies of children who do read early generally report a higher mental age range. There is no evidence that a particular mental age is sufficient for learning to read early.

Durkin's study of early readers (1966) reported that about 1% of 5000 children entering public schools in 1958 were able to read as many as 18 out of 37 words in a simple test she administered. She found her readers to be similar in many ways to their non-reading peers, matched according to I.Q.

Of her sample of 49 early readers, only seven came from professional or upper middle class homes, the rest from lower middle class homes or lower class. In general, Durkin's early readers were above average intelligence although there were children in the 90-100 range.

Clark (1973) studied Scottish children, who entering school at 5 years already able to read, particularly those from less privileged backgrounds. Some of these children had access to books and were read to, but for other children, their early reading material had been that found on cereal packages, TV commercials, and in the yellow pages of
the telephone directory. An important characteristic of these children was their understanding of what they could or could not do.

Torry (1969) reported working with a 5 year old black boy who began kindergarten able to read fluently. She described him to be of average verbal and general ability (104 I.Q. on WISC). His language deviated from standard English both in articulation and grammar. Torry's observations include examples of working with the boy on numbers. She reports that although he could count easily,

... his concept of the quantities they [the digits] represented was very limited. ... Although he could count ... or identify any number, he was not able to determine the number of objects put before him by counting them (p. 154).

This kind of response is a clear indication of pre-operational thinking. The child's mother insisted he had learned to read by himself, that he had shown great interest in TV commercials, and that she had responded if he had asked questions. Parents in Durkin's studies of early readers, also reported that children had themselves initiated the learning and they had helped by responding to questions. She also reported information from some parents who had tried to teach their children to read and had met with no success.

The efficacy of instruction in early reading has been investigated from time to time and from various theoretical positions (e.g., Gates, 1937; Fowler, 1962; and Doman, 1965). Most relevant to the present study is the recent investigation by Durkin (1970) who attempted to adapt her findings about early reading to a classroom program, and like Fowler in his research found that very few four year olds could be taught to read. Durkin worked with groups of 18 children for 20 minutes
a day throughout their fourth and fifth years. At the end of their first year in school the boys could identify an average of 24 words and the girls could manage 35 words. At the end of kindergarten boys could identify an average of 109 words and girls, 143 words. The criterion for measuring reading in this study was not consonant with a concept of reading as, "being able to understand by reading language which one can understand if the language is presented aurally [Biemiller, 1974, p. 1]."

It is important to note that the "reading" results were achieved by intelligent children (average I.Q. 114) taught in small groups by a teacher (Durkin) who possessed insight and understanding of the reading process of a high order.

One could concur with the comment of Ausubel & Sullivan (1970):

The crucial issues are whether such early learning is reasonably economical in terms of the time and effort involved, and whether it helps children developmentally in terms of their total educational careers (p. 97).

Durkin (1966) found that children who read early are successful throughout their elementary school years. The question rises as to whether this in itself warrants focusing on early reading for all children. Becker & Engel, (1974) using a code-emphasis program (DISTAR) in optimum conditions (with regard to teacher-child ratio), found that children who began learning with this program in kindergarten and tested at the end of 3rd grade differed in reading age by 0.4 years from those who began in grade one. In interpreting results of such studies, Biemiller (1974) cautions that one should be clear about the range of differences among the children reported upon. The reported
gains may be from the proportion of children who demonstrated learning in the first year of instruction.

Furth (1970), deplored the time wasted on reading instruction at an important stage in life for learning, generally -- a time when children are rapidly developing important intellectual structures that form the basis for all future learning. He perceived real danger in reading instruction that is imposed too powerfully from "outside" the child's own learning structures, that takes away from the child "the spirit of initiative and discovery [p. 69]." Furth expressed the opinion that a number of the intellectual and social failures in present society can be traced back to reading pressures on children who for social, intellectual or emotional reasons were unprepared to cope with it. He criticized early education that emphasized figurative, low-level operative learning and he put most reading instruction found in schools in this category.

This existing dichotomy between emphasis on the early teaching of reading as an aid to future learning and providing a learning-thinking school environment for young children to encourage learning in a broader sense might gain perspective by examining adult literacy in a world context. It is common practice in many countries, e.g., Iceland, Norway and Sweden, to begin school at 7 years. Yet these countries have high rates of literacy. In fact, Iceland has the highest rate (Downing, 1973).

Biemiller (1974) discussed the desirability of again testing a later beginning of reading instruction combined with the low teacher-child ratios used in studies of early reading. Such practice would
eliminate the sense of failure and frustration experienced by so many children caught up by pressures for which they see no relevance. The potential waste of intellectual energy in early instruction is shown in Biemiller's hypothetical construct of the age-related, time and effort requirements for mastery of a particular reading skill. He reasoned that

... a particular child who could learn to read at age six in 180 days of group instruction in a typical first grade class might require more individualized instruction and 250 days to attain the same skill at age 5, and still more individualized instruction plus more time at age 4 (p. 3).

Explicit Instruction, Implicit Learning in Learning to Read

The research into early reading has been concerned with two widely different aspects of early reading. On the one hand, investigations have found children who could read before beginning school and endeavored to discover how this came about (Durkin, Torry). On the other hand, investigators either built what seemed to have been important factors in successful early reading into a program hoping to achieve similar results, (Durkin, 1970), or convinced that early reading success was desirable for later educational success, produced programs considered to simplify the reading process (Becker & Engelman, 1974). It was evident from these studies that after two years of instruction only a minority of children could read independently. Torry (1969) concluded from her close observation of John that, "Reading for John seems to have been learned but not to have been taught by anyone consciously aware of teaching him." He appeared to form the right questions in his own mind about the relation between language and the printed form. She wondered if "the key for learning to read may
be the child's asking the right question of his environment. If the child does that he will be able to get answers from a variety of sources.... [p. 156]."

Furth would concur that self-directed probing of one's environment is the "key to learning," generally, not just to learning to read. This certainly would be compatible with understanding the construction aspects of learning explicated by developmental and cognitive psychologists as reviewed above. The inference could be made that an over-emphasis on early reading instruction actually interferes with the way a child himself learns. Isaacs (1960) discussed the 'main-stream' of a child's learning and the need for educators to join it, not cut across it.

In discussing the implications for education from a language acquisition perspective, Cazden (1972) noted that adults may interfere with a child's learning to talk if they "press for behavior that looks or sounds 'correct' regardless of its relation to the child's internal mental organization [p. 136]." Perhaps the same interference occurs in early reading instruction when the emphasis is on teaching reading with little knowledge of, or regard for, the children's own thinking and ways of processing information. To illustrate what may occur when adults "teach" structures which children then merely imitate, Cazden (1972, pp. 110-111) referred to Brown & Hanlon's study of the development of children's 'wh' questions. The children heard their parents ask such questions and they reproduced them in roughly appropriate situations. In their analysis of the way the children used these constructions, however, Brown & Hanlon concluded that they had not
yet assimilated the rules of the structure. They described the children's performance as having "the kind of rigidity that we have learned to recognize as a sign of incomprehension of structure [Brown & Hanlon, 1970, p. 50]." The "wh" terms were not reconstructed by the children as readily as the more rule-governed errors, (e.g., "goed" and "mines"), which the subjects quickly shed as they became aware of certain exceptions to the rules for past tense and possessives.

The power of implicit learning is demonstrated in the way children, before entering school, acquire a language-system complete with its own rule-governed grammar, without formal instruction. Apparently, they manage this feat from the language around them and the feedback available in everyday conversation. With very little explanation and no teaching of rules, the child can generate a variety of novel and well-formed sentences as Moffett (1968) described "according to a paradigm or model they have unconsciously inferred for themselves." He continued

The learners abstractive apparatus reduces a corpus of information, such as other people's sentences, to a usable rule. It is a data processing gift that enables us to learn something but not how to do something (p. 90).

The necessary feedback has come about in the everyday social interaction between speaker and listener, each one concerned with communicating, with comprehending and meaning. Responses are real and pertinent to the communication and feedback is immediate, given at the optimal moment. In this immediate, personal situation, the child is best able to assimilate a wider range of samples to his developing schemes.

Cazden (1972), described the raw material for the child learning language as "a rich set of pairings of meanings and sound [p. 141]."
She noted that in learning to read, the child must learn relationships between oral language and letters of the alphabet, "but a rich set of pairings between oral and written language is much less available."

She gave an example of when it is most available:

It is available when the child is read to while sitting on an adult's lap....; it is available when the bouncing ball accompanies TV commercials; it is available whenever the child points to any writing and asks 'What's that say?'; and it is available whenever the child himself tries to write (p. 141).

Reading as a Language-Based Process

All young children acquire language in a very personal way from their interaction with the environment. Most of them have access to some form of written language, certainly to the limited form from which John (in Torry's study) learned to read. It is intriguing that some children pay special attention to language and, as Torry says, seem to ask the right questions about the relations between language and print.

Increasing support for the concept of reading as more than a collection of skills has emanated from the explosion of knowledge during the sixties in relation to language acquisition, and the effects of subcultures on language development and language use (Bernstein, Shuy, Labov). Reading increasingly is seen as a further development of language. New models of reading reflect these recent developments in language learning and use as well as insights from work in information theory, notably, from Goodman (1967) and F. Smith (1971).
Psycholinguistic Conceptions of the Reading Process

Psycholinguistic conceptions of the reading process, as developed in models by Goodman and F. Smith, contributed much to the conceptual framework of this research. Reading, as explained by Smith (1971) is seen as a communication process and a language activity which involves the use of cognitive processes. He, in common with Kolers, maintains that reading is only incidentally visual and that what the reader brings to reading in terms of knowledge of language and experience is basic to "reducing the uncertainty" of the visual-graphic material. The reader's implicit knowledge of language enables him to take advantage of the sequential and distributional redundancy inherent in our language. Redundancy is defined by Gatherer (1973) as "the splendid liberality of clues to meaning that language possesses," which means, in effect, that a reader has available more information than he needs, to reduce the uncertainty of a message to a level that he can comprehend. It enables him to sample from the visual information and make predictions. He tests his hypothesis, or prediction, against further information which confirms his prediction, or if there is some dissonance, sends him back for further information. In this way reading is a constructive process, with the reader constructing meaning from the available graphic display.

Goodman (1971) has drawn from the fields of psychology and linguistics in order to describe the psychological, physiological and linguistic functions within the process of reading. He maintains that the reader samples from the grapho-phonic, syntactic and semantic information available in the visual array. He tests his sample to see if his
predictions were acceptable semantically and syntactically. If there is a dissonance between the prediction and confirmation, it is corrected by further sampling and predicting.

Goodman (1973) conceives reading as primarily concerned with decoding, but notes that oral reading also involves encoding, since the reader must produce an oral version of what he reads. Goodman's (1969) findings indicated "that proficient readers decode directly from the graphic stimulus and encode from the deep structure." They use all the available information simultaneously without having to reconstruct each word individually. Any mistakes made, or "miscues" as he calls them, are generated in response to the same cues and from using the same processes as correct reading.

Both Smith and Goodman have endeavored to describe the reading process in terms of the proficient reader. They affirm that reading is not a process of combining individual letters into words and strings of words into sentences leading eventually to comprehension. "Rather the evidence is that the deep level process of identifying meaning either precedes or makes unnecessary the process of identifying individual words [Smith, 1973, p. 180]."

It is this phenomenon that Kolers (1969) has in mind when he says that reading is only incidentally visual. He describes experiments devised to investigate reading that have identified three different levels, or stages of competence in the skilled reader; viz., (1) perception of characters, or visual operations, (2) perception of syntax, or sensitivity to grammar, and (3) direct perception of the meanings of words (p. 91). Kolers' experiments with subjects reading from transformed
text, and reading words with letter-position errors indicated that the reader's expectations govern what he "sees" in the text and that familiar words are perceived as wholes rather than piecemeal. His analysis of errors made revealed a great sensitivity to grammar as a characteristic of normal reading. The investigator's thesis was that the reader does more than simply identifying or discriminating letters, or words. His subjects showed more sensitivity to the grammatical relation of what they were reading than to the printed words themselves (p. 105). An ingenious experiment in which bilingual subjects read from a text containing French and English words showed subjects freely using words from both languages. For example, he might say "door" when "porte" was printed, or the reverse. Kolers interpreted this to show that the skilled reader is not operating "in terms of a passive, but faithful, mouthing of the text;" rather, "he is treating words as symbols and is operating on them in terms of their meanings and their relations to other symbols [p. 112]."

The emphasis by researchers on studying "the most primitive aspects" of the reading act is castigated by Kolers who suggested that reading will be understood only if simple behavior is understood as only a part of more sophisticated behavior.

Morris (1973), reflected a similar concern in his insistence that the way instruction in learning to read is given, should not be an obstacle to achieving eventual reading maturity.

Applying Psycholinguistic Knowledge to Reading Instruction

Authorities such as Smith and Goodman are convinced that the psycholinguistic analysis of the reading process can be applied directly
to the study of learning to read. They posit that if children's access to the written form of language is not restricted to stereotyped classroom or textbook materials and they are exposed to a much wider range of choices, children will have greater opportunity to detect the significant elements of written language. Reid (1973) recognized a growing sensitivity to this concern in new reading materials:

Simplification now takes a different form--that of giving them content which will be relevant and one hopes interesting, a vocabulary within their comprehension, contexts for the written word which make sense to them and, increasingly, syntactic structures which follow the pattern they use in their speech (p. 31).

There is evidence that even beginning readers look for and use a wide variety of cues, making use of orthographic, syntactic and semantic redundancy as they read. Smith (1971) describes as "dramatic discoveries" the evidence that children know so much about reading, right at the beginning. Studies relating to reading errors (or 'miscues'), notably by Goodman (1967), Clay (1969), Weber (1970), and Biemiller (1970) have given these new insights into the reading process. A common factor in all of these studies is that reading is seen as a psycholinguistic process in which the reader functions as a language user. Goodman (1973) described it in this way:

Readers seek actively to reconstruct from a graphic display a message which the writer has encoded. In this process, the reader draws on his pre-existing linguistic competence and brings his experiential and conceptual development to bear on the task. The goal is always some degree of comprehension.

The Reading Miscue

Goodman posited that all reading behavior is caused behavior. He uses the term "miscue" to refer to any deviation from the text made while
reading orally. "It is an instance where a reader's observed response (O.R.) differs from the expected response (E.R.), [K. Goodman, 1969, p. 19]." In a study reported in 1965 Goodman asked children to read from a list of words, and then to read a story containing the same words on the list. He found that the children could identify many more words in context than on the word list. This was taken as evidence that readers make use of cues provided by the context.

New research was initiated to develop a system by which to analyze oral reading behaviors that would be sensitive to many factors. A taxonomy was developed which provided a framework for investigating the degree to which a particular reader uses graphic, phonic, syntactic and semantic cues while reading (Goodman, 1967, 1969). Hence, miscues are not accidental or haphazard. Goodman concluded that, "by contrasting the actual reading with the expected reading, we are able to gain insights into the use and misuse of available cues and the processes used by readers as they read [1973, p. 4]."

Studies Related to Children's Errors or Miscues

The degree to which children's use of their oral competence is reflected in their reading behavior was investigated in studies carried out by, among others, Goodman (1967), Clay (1969), Weber (1970) and Blemiller (1970). These studies too, show evidence of other learning behaviors. Goodman shows that children tend to re-organize language to conform to their own speech patterns, so that even early reading is not just sequential processing but "a psycholinguistic guessing game." Clay's study examined the self-correction of reading errors by 5 year old children in their first attempts at reading at the beginning of
school. Weber, from her analysis of errors made by first grade children, recognized a "progressive refinement of strategies."

Clay, Weber and Biemiller made longitudinal studies of first grade children, using basic reading material. Weber found that 90% of the errors were grammatically appropriate to the preceding context, and 63% to the grammatical structure of the whole sentence. She found that beginning letters were apparent as cues in 49% of errors with graphic similarity to the text. Weber studied children's self-corrections and found that errors made by the better readers were more often consistent with the whole sentence, that is, with context on either side of the error, than were those of poorer readers.

Biemiller examined children's miscues in terms of contextual constraint, i.e., whether or not they made sense. He, too, found a high proportion of syntactic agreement. He also found a developmental trend. Children in the first stages of reading made use of contextual clues; i.e., their errors "made sense" but were not graphically similar to the text. In the second stage, there was a preponderance of non-response errors and a significant increase in graphic similarity of errors to text. In the third stage there were again response errors but there was greater agreement with graphic information. Biemiller found this increase in using graphic information resulted in a major change in reading ability as children extended their range of strategies. He posited that Stage 2 was a transition stage when the children became aware of correspondences between word sounds and graphic pattern.

An interesting, but bothersome, implication drawn by Biemiller was that "early use of contextual information does not appear to greatly
facilitate progress in acquiring reading skill [p. 95]." He found that a child who continued using only contextual clues remained a poor reader. Hence, the teacher should teach early reading in situations that provided no context at all. In this way children would be forced to seek more graphic information.

Clay (1969), reported a high incidence of syntactic similarity in the miscues made by her subjects during their first year in school. She found that only 41 percent of miscues "showed that subjects might be responding to some visual characteristics of the letters [p. 437]." An important finding was that reading behaviors and strategies began to emerge from the beginning of the year. Using the concept of dissonance as explicated by Festinger (1958), Clay noted that children early recognized dissonance between what they said and "one of the several messages from the text [p. 53]."

Clay recognized two kinds of dissonance; viz.:

1) cognitive dissonance - which occurred when the response did not make sense in the story, in the sentence, or with the pictures.

2) perceptual dissonance - the response which made sense but there was some incongruity with the print. For example, the child may read, "Mother said" for "Mother asked" and then protest, "It hasn't got the same letters as 'said'," or "But it starts with an 'a'!!"

**Self-Correcting Behaviors**

Self-correcting behaviors were seen in Clay's study when children found a lack of correspondence between the movement of their eyes, or
fingers, and the number of graphic forms. This caused them to search. Perceptual dissonance brought a recognition of the possibility of alternatives to the children's attention. When they found it necessary to choose between "Mother said" or "said Mother" they became aware that "the precise identity of a word allows for no difference between what makes sense and what is said." Their oral language competence determined the grammatical function used.

At the end of the year of study Clay identified four groups of readers. She described the "good readers" as able to perform a "smooth predict and check procedure" operating at the level of word groups; but stated further that a really proficient reader "would be able to descend to any level of detailed check, if the need arose, to solve a conflict."

Clay stressed the value of children recognizing the importance of conflict -- or dissonance -- at an early stage, and developing it for its value as a way of learning. The child who expects consonance, that is, expects what he reads to have some meaning is more likely to recognize dissonance. Clay points out that the errors made by the children in her study were surrounded with large quantities of correct responding and long stretches of context with a full measure of syntactic, semantic and story sequence clues ... [which provided] a detailed background to the error when it occurred [p. 54]." Clay appears to recognize a value in a supportive context that Biemiller did not. Both Biemiller and Weber recognized constraints brought about by their use of first grade reading material in their studies. The sentences were short and simple so the opportunity to assess the processing unit used by the children was curtailed (Brown, 1968). Weber found that the
limited sentence style caused some intonation miscues and the format induced some perseveration of word pattern. Biemiller found that some children hesitated to guess, or predict, because they were unwilling to use words not learned as "reading" words.

A Rich Context Required for Reading

Mackay (1973), commenting on the kind of reading material so often offered to early readers, says that school children often refer to two kinds of books: "reading books" and "real books" (p. 14). Huey, as long ago as 1908, was criticizing early reading material:

The most striking thing about at least three-fourths of them [primers] is the inanity and disjointedness of their reading content, especially in the earlier parts. No trouble has been taken to write what the child would naturally say about the subject in hand, nor indeed to say anything connectedly or continuously, as even an adult would naturally talk about the subject (pp. 278-9).

Reid (1970) says ruefully, "The aptness of Huey's structures is borne out, -- by the fact that all the work on vocabulary and readability undertaken since his time has not removed the grounds of his criticism [p. 26]."

Morris (1973) was emphatic that the type of reading material given to the beginning reader should be such that he should be able to make a personal and active mental response. If learning to read is a continuous process, and the aim is for maturity in reading, then "it is imperative that the development of response to message which is of paramount importance in the mature reader, shall not be ignored at any stage, however rudimentary the learner's recognition skills may be and however simple may be the 'message value' of what is read [Morris, 1973, p. 82]."
The recognition of dissonance in Clay's study demonstrates response on the part of the "good" readers to the message of the text. Clay (1972) criticizing some "reading readiness" suggestions says categorically, that concepts conceived within reading are acquired only within the context of the written language itself. When discussing the errors and self-corrections made by the children in her study she emphasized the value of "texts rich in cue sources." She thought that the fact that such strategies could be developed by the young child still in a stage of intuitive rather than logical thinking, could be best explained in terms of "Neisser's concept of multiple thought processes which he considered appropriate for dealing with novel, irregular stimuli too complex for logical, sequential thinking [p. 55]."

A rich context then is the source of concepts concerned with reading, a context wide enough to include literature; i.e., stories in "real" language, to which children can respond emotionally and intellectually. Such a context includes all the written language available in the environment, and language composed by the child himself in relation to his everyday experiences. Such a context generates the field in which pre-attentive processes (Neisser, 1966) operate to form very basic concepts of literacy.

Pre-attentive and Focal Processes

Neisser describes pre-attentive processes as a kind of contextual background within which attention can be focused on any chosen part of the visual field. This means that the object of focus remains integral, that is, it exists only in relation to its context. The processes of focal attention cannot operate on the whole field at the same time, they
"come into play only after preliminary operations have already segregated the figural units [p. 89]."

This corresponds in some ways to the two levels of skilled performance distinguished by Polanyi (1964), which he terms "subsidiary" and "focal." Again, the notion is that learning occurs that is subsidiary to the point being focused upon. For example, when a child is being read to, it is likely that he is paying attention to the story, rather than to the understanding of sequence, or the patterns made by the words, although he may at anytime focus upon any particular aspect of the area subsidiary to the main focus. Neisser suggests that there is a hierarchical order in the pre-attentive processes and that skills at one level are components of skills at the next level. The Piagetian view could be expressed as, the adaptive behavior of the organism constantly seeking equilibrium, assimilates new experiences and accommodates to form new structures.

Operative Structures Develop Within a Rich Context

All these authorities have in common the basic concept of a subsidiary background within which much tacit, or unconscious, learning continues and which, itself, makes possible learning at another level. It was in this way that Reid's (1966) subjects, who at first described the graphic display as "the squiggles" and "the border" were able to abstract a realization that the reading material was the "stuff" that contained the message. Johnson & Tamburrini (1972) give an example of use of visual--verbal symbols: Debbie (five years) having seen the teacher write a story under a friend's painting said, "I want some of those things under my picture [p. 27]."
The notion of "message" and "sequence" already part of a child's oral competence, become organized into operative knowing about the written form of language as the children make further assimilations from stories, books and labels, and written material of all kinds.

Clay (1972) devised a diagnostic test to check school beginners for their understanding of significant concepts about printed language. The "Concepts about Print" test is entitled Sand. It is in the form of a simple story book. The child is asked to help by pointing to certain features as the investigator reads the book. This makes it possible to discover the child's present understanding of concepts, such as: it is the print (not the pictures) that tells the story, what letters and words are, capital and lower case letters, and uses of punctuation. This test reflected changes in awareness and understanding of these concepts that emerged during the first year of learning to read, using reading material that reflected the language and interests of these young children. Goodman (1972) noted that one element of a theory of reading instruction is that "language exists only in the process of its use and that instruction must view and deal with language in process. This mitigates against any possible sequencing of reading skills [p. 155]." Clay (1972), too, says, "There is no single set sequence of skills required for beginning reading... [p. 36]." She describes how fast learners "hop, skip and jump through the preparatory stage [p. 36]." They are constantly making new assimilations to their present schemes as they extend their operative knowing.
Analysis of the Reading Process in Relation to Instruction

Part, Whole-task Learning

It is common practice in reading instruction to analyze the process into component parts and then find a rational basis on which to build a learning program with tightly sequenced instruction. Anderson (1968) commented on the differences between sequencing instruction in a prescribed fashion and whole-task learning in which the learner has access to all available information from the beginning. He stated that educators who have been influenced by the programmed-instruction movement take it as self-evident that the best way to teach a complex skill is to analyze it into component sub-skills and subconcepts, then teach each of these in turn. Cast in different language such an approach is a part-task method, to be contrasted with the whole-task method in which the student is required to perform the terminal behavior as best he can from the very beginning of training (p. 207).

Cazden (1972) suggested that in selecting from such methods of instruction it should be noted that "all oral language learning that takes place before the child goes to school--takes place on a nonsequenced, whole-task basis." The child is encouraged from the very beginning to participate in any way he can. Feedback from adults is generally concerned with understanding the meaning of a child's communication rather than correcting the form. From this participation the child builds his own language system. As Cazden again noted, "Whatever environmental assistance the child gets it is clear that he never gets sequential tuition based on an analysis of component skills. When a richly supplied cafeteria is available from the beginning, no carefully prescribed diet is necessary [p. 138]."
Relationship to General Learning

Further evidence of the child's ability to construct his own learning from his interaction with the environment available to him, is found in Isaacs, (1960) and Navarra, (1955). Isaacs described the young child as having already constructed a basic working model of the world in his mind which he uses for the assimilation of all his new experiences. He continues,

In the course of these further assimilations, the original model is itself constantly extended and further filled in. At the same time its content is being sorted and grouped and ordered in diverse ways, by various kinds of likenesses and relationships. ... if the conditions are right, it should steadily grow more comprehensive and better adapted to the real world...capable of even more effective assimilation of new experience (pp. 48-49).

Isaacs stressed the continuity of learning -- how "further integration can only be built on effective past integration" and how this continuity can be broken when learning without understanding and integration is intruded into the process. Sequenced instruction (that is, superimposed learning) can intrude and, by not being assimilable to the learners' structures, can prevent integration of learning and impair future true learning.

Navarra kept a detailed record of his son for more than two years, beginning when he was three years and two months old in an effort to get a continuous long-term observation of the child's development of scientific concepts. His analysis of the data revealed "... the essential individual continuity of experience and learning [p. 142]." Navarra found evidence that growth in understanding the environment seemed to be directional and systematic. The process used by the child
was to interpret his observations in the light of previous logical thought out relationships within his own experiences. Navarra noted that "growth was not evidenced merely as an additive process in which new experiences were accumulated; the growth was also a matter of integration which made new relationships among old and new experiences [p. 35]."

**Summary**

The literature assembled here points to the fact that learning to read is a complex process. The learner fuses information from linguistic, perceptual and conceptual sources in order to determine the message in the text.

The evidence given, culled from developmental and cognitive psychology, supports the view that learning-to-read is part of general learning, that learning takes place through the constructive action of the learner himself as he integrates new learning into existing structures, thus paving the way for further learning.

Evidence from the field of psycho-linguistics demonstrates that the reader's oral competence is fundamental to reading at any level.

There is continuing disagreement concerning the way in which learning to read should happen, how this particular learning is acquired, and when a child is best able to assimilate it. It appears that for formal instruction -- in which the learner is expected to think logically and consciously and to form hierarchies of classes -- there exists a consensus of opinion that the optimum time is around six-and-one-half years, or around the end of the pre-operational stage of development for most children.
Central to the problem of time for initial instruction is the relation between focal and subsidiary learning and "part-task" or "whole-task" approach to learning. The evidence suggests that the way young children acquire language, the way precocious readers acquire reading, and the way all pre-school learning in general is acquired is other than part-task or carefully sequenced instruction. The whole notion of tacit learning is evidenced by the child's implicit knowledge of language. This in turn, is clearly reflected in the findings from research related to children's errors or miscues.

Clay (1969), provides evidence of children, as young as five years in the school situation, being introduced to reading in a context that allows them to build concepts about reading and early strategies for reading in a way similar to the intuitive learning of precocious readers. Blemiller (1974) suggests that an age range of four to ten years should be accepted as appropriate for particular children to learn to read.

Durkin (1970) reminds us that being ready to learn to read does not require that children learn everything at once. This would not be in the nature of learning generally or of acquiring the reading process. Clay's study showed how the process of learning to read progressed for her subjects during their first year in school.

The complexity of the range of learning underway in the early years and an understanding of the integrative nature of learning itself suggests that children must have operating a wide range of assimilatory schemes. This suggests a profitable area for research into the acquisition of literacy. There is a need to probe into children's underlying structures, to obtain details of the level of operative knowing underlying their
performance and the rationale they give for this performance. Studies have been made of the understanding young beginning readers have of particular linguistic concepts (Reid, 1966; Downing, 1970), but little appears to be known of the status of these concepts in young precocious readers or in children at the end of the concrete operational stage who are reading. Is it possible that the ability to read can precede the understanding complex literacy concepts just as the ability to speak long precedes understanding linguistic concepts?

Ways need to be found of studying the child as he acquires, uses, and integrates information. There is a need to find out exactly what he is paying attention to and what strategies he has developed. The very nature and strength of the personal approach of the young child, and his essential egocentricity make this possible only if a dialogue exists between researcher and subject. The task is not merely to gain a static picture of present performance but to endeavor to probe into the process of learning, itself, in-so-far as this is possible. These concerns formed the basis for the research reported here.
CHAPTER III

Procedures of the Study

The research literature investigated in relation to this study portrays the young child as a constructive learner engaged in a complex range of ongoing learning. An understanding of the integrative nature of learning indicates that children must have operating a wide range of assimilatory schemes. As the young child gains access to the written form of language, schemes develop in relation to literacy. From the first figurative awareness of the existence of print, the child's operative knowing develops to form schemes and eventually concepts pertaining to the written form of language.

The purpose of the study was to probe into children's operative structures in order to ascertain (1) the focus of their attention; (2) the strategies they had developed; and (3) the status of their understanding of concepts, such as, letter, word and sentence. A relationship was sought between the child's ability to read and the quality of his literacy concept development.

The study was conducted over a period of ten weeks in three phases, as follows:

In Phase 1, subjects were identified and assigned to one of three groups according to the criteria set for each group.

In Phase 2, the subjects were interviewed in order to probe their understanding of concepts within language, generally, and of written language, specifically.
In Phase 3, the Reading Miscue Inventory was administered and children were given the tasks involving Inclusion and Logical Addition.

Population

The population of the study was made up of 21 subjects selected according to criteria established for three separate groups. The requirements for the first group (Group I) set certain of the criteria for the other two groups. The requirements for subjects in the first group were (1) that they be children who had not attended first grade, but who could read at no less than second grade (2.0) level. This group was referred to as the "precocious readers."

The mental age of the precocious readers became the control, the independent variable, for the other two groups; their chronological age also established the chronological age range for Group II, the "non-readers."

Group III, the "older readers," were selected on the basis of a mental age range similar to Group I, but their chronological age range was one year advanced. All subjects in this group were in the last term of the first grade.

The subjects, then, formed three groups of seven members each, as follows:

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<td>Group I Precocious Readers</td>
<td>5.4 -- 6.4</td>
<td>7.4 -- 9.0</td>
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<tr>
<td>Group II Non-Readers</td>
<td>5.4 -- 6.4</td>
<td>7.4 -- 9.0</td>
</tr>
<tr>
<td>Group III Older Readers</td>
<td>6.6 -- 7.6</td>
<td>7.4 -- 9.0</td>
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</tbody>
</table>
Mental age was held constant in this study in order to investigate subjects with a similar level of mental development. Thus, variations within subjects at a comparable stage of mental development could be examined and their individual performance explored. Because of the small number of subjects and procedures used to select them, these subjects must be considered the population - not a sample.

The subjects for this study were drawn from three different schools in Metropolitan Franklin County, Ohio. Two were in middle-class, suburban school districts and the third was located on the edge of the inner city where population was mixed, socially and racially. These three schools were used simply because the investigator had easy access to them.

**Phase I: Selection of Subjects**

The initial and most important task was to identify Group I, the Precocious Readers. A similar procedure was followed in each of the three schools.

1. The investigator described to the class teacher the criteria for selecting subjects for Group I: i.e., the chronological age range and the ability to read. This was subjective since there were no test scores available.
2. Any child initially suggested by the teacher and willing went with the investigator to a nearby room where they could talk without interruption.
3. Books were available, ranging in reading difficulty from first to fifth grade. The child was invited to examine the books, to discuss them, and to select any one he would like
to read. His reading ability was judged on the basis of a definition given by Biemiller (1974). "By read, I mean being able to understand by reading language which one can understand if presented orally."

4. If the child was able to read a book, or part of a book, he was then tested using a Slosson Oral Reading Test (SORT, Slosson, 1963).

5. If the child's score on SORT exceeded a reading grade of 2.0 he was selected for Group I and a Slosson Intelligence Test (SIT, Slosson, 1963) was administered to determine mental age.

In all, thirty-five children were interviewed before this first group was complete.

The criteria for selecting Group II members were as follows:

1. C.A. between 5.4 and 6.6, and M.A. between 7.4 and 9.0, the range determined by Group I; and

2. Inability to identify more than twelve words on SORT, i.e., a reading grade equivalent score below 0.6.

The procedures for selection were similar to those used for Group I. In all, 33 children were tested before Group II was complete.

Group III was selected last on these criteria:

1. C.A. between 6.6 and 7.6,

2. M.A. between 7.4 and 9.0, and

3. reading ability not below a reading grade equivalent of 2.0, on SORT.
The procedures for selection were similar to those used for Groups I and II. In all, 15 children were tested before Group III was complete. The subjects were not randomly selected but self-selected, insofar as they met the criteria for a specific group. No attempt was made to match sex, social background or to form representative groups from each school, or grade level. Three children were in pre-kindergarten classes, eleven were in kindergarten and seven were in first grade.

The range of the chronological ages of the subjects and their corresponding mental ages within each of the three groups is shown in the following table.

**TABLE 1**

Distribution of Chronological Ages and the Corresponding Mental Age of Subjects

<table>
<thead>
<tr>
<th>Group I - Precocious</th>
<th>Group II - Non-Readers</th>
<th>Group III - Older Readers</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.A.</td>
<td>M.A.</td>
<td>C.A.</td>
</tr>
<tr>
<td>5.4</td>
<td>8.4</td>
<td>5.5</td>
</tr>
<tr>
<td>5.6</td>
<td>7.4</td>
<td>5.7</td>
</tr>
<tr>
<td>5.9</td>
<td>8.0</td>
<td>5.9</td>
</tr>
<tr>
<td>5.11</td>
<td>7.10</td>
<td>6.0</td>
</tr>
<tr>
<td>6.1</td>
<td>9.0</td>
<td>6.0</td>
</tr>
<tr>
<td>6.3</td>
<td>9.0</td>
<td>6.3</td>
</tr>
<tr>
<td>6.6</td>
<td>8.2</td>
<td>6.3</td>
</tr>
</tbody>
</table>
**Instrumentation**

Instrumentation used in this study fell into three categories:

1. **Test to aid in selecting subjects that met specific criteria of mental age and reading achievement:**
   a) the Slosson Intelligence Test (SIT) for Children and Adults and
   b) the Slosson Oral Reading Test (SORT)

2. **Instruments concerned with examining the reading behavior of each subject and their understanding of concepts relating to the written form of language:**
   a) "Concepts about Print" Test, entitled Sand by M. Clay (1972),
   b) Non-English words from Phonological Studies by Messer (1967),
   c) The Reading Miscue Inventory by Burke and Y. Goodman (1971) which includes the Goodman Taxonomy of Reading Miscues, and
   d) an assortment of children's literature with reading age of grade one through five for subjects to read orally. A list is provided on page 76.

3. **Piagetian tests of Class Inclusion and Logical Addition** were administered to determine specific cognitive growth.

   Additionally, the investigator held an informal discussion with subjects in order to determine (1) attitudes to reading, (2) understanding of its purpose and function, (3) understanding of their own
learning on how to teach a younger child, (4) understanding of the written language and their writing abilities.

**Description of Instruments**

A description of the various instruments and the way they were administered follows:

Slosson Intelligence Test (SIT) for Children and Adults was used to provide data regarding general intelligence; specifically, mental age since MA was the independent variable in this study. SIT is a short individual test, suitable for use with young children since it can be done in a friendly, question and answer session with no time-limit. Elkind (David Elkind, personal interview, Columbus, Ohio, May, 1974) stated that he had found it to be a suitable instrument in testing young children.

Extensive data is cited in the Manual to SIT which corroborates the validity of the test and gives details of correlation obtained with a number of independent measures including the Stanford-Binet, Wechsler Intelligence Scale for Children (WISC) (1963, p. vii).

The Slosson Oral Reading Test was administered to each child individually. The words in the test were taken from standardized school readers; and the reading level obtained from testing represents the median or standardized school achievement. The test Manual states a correlation of .96 was obtained with the Gray's Standardized Oral Reading Paragraphs on a group of 108 children from first grade through high school and cites a reliability coefficient of .99 with a test-retest interval of one week.
The "Concepts about Print" Test is a small paper-back story book called *Sand* and an accompanying *Manual* (Clay, 1972). It was designed by Clay to allow teachers to check new entrants to school, or non-readers on their knowledge of significant concepts about printed language. Clay found the reliability of the test was confirmed when 40 children between CA of 5 to 7 years, tested and retested after an interval, had scores that correlated at 0.95 level. The validity of the test was confirmed in 1966, when a 0.79 correlation was found with a Word Reading Task for 100 children 6 years old.

The test is in story form, designed to be read to each subject individually by the examiner. The child is asked to help the examiner by pointing to certain features as the book is read. The concepts examined relate to (1) knowing the print (not the picture) tells the story, (2) knowledge of "a letter," (3) knowledge of "a word," (4) capital and lower case letters, and (5) uses of punctuation. The test reflects reading performance during the first year of instruction. Scoring consists of one point for each correct response, including a total of 24 points.

The raw score is converted to a stanine score, a normalized standard score of nine units, ranging from one to nine. An individual child's stanine score indicates his status relative to all children in the age group 5.0 to 7.0.

In this study, the test was used in two ways:

1. to determine children's understanding of concepts in printed language, as designated by Clay.
2. to ascertain from children in Group I and III, who read
the story aloud, information related to individual
a) ways of coping with transformed print as given on
page 8: "I sat into my hole in the sand."
the waves splashed
b) reaction to faulty syntax, on page 12: "I sat in
hole and I splashed my with feet."
c) reaction to position errors within words on pages 13
and 14: "ni" (in), "eth" (the), "heer" (here), "wim" (swim).
d) discussion of punctuation, capitalization, and sentence.
Sand was selected because it allowed insight into subjects' under­
standing of basic concepts in written language, within the context of
continuous prose.

Phonological Studies. The investigator used and extended Messer's
(1967) study in order to find evidence of any shift from children's
implicit understanding of phonology to implicit and explicit under­
standing of possible visual patterns in written language.

Messer had investigated the ability of subjects (N. 13), ages 3.1
to 4.5, to discriminate between monosyllabic words that were possible
English words and those that were impossible English words. He postu­
lated that ability to discriminate; i.e., to choose consistently the
possible English rather than the impossible English word, could provide
evidence that the child had abstracted and internalized the implicit
syntax of phonemes. This test was extended in the present study to
ascertain subjects’ awareness of visual patterns in words, understood implicitly, and also to look for evidence of explicit understanding.

Eight pairs of words were selected from Messer’s original list of 25 pairs. Four pairs contained non-existent but possible English (PE) words and another word that was one degree removed from PE, i.e., only the initial cluster was not possible in English. For example frul and mrul formed one pair. Frul: is a possible English; mrul, is not as the initial consonant cluster, mr, does not occur in English. It is rated an impossible English (IE) word, one degree removed from PE. In the other four pairs of words, both the initial and final consonants of the impossible English words (IE) violated English usage. For example gnibel and snirb:

- gnibel: both the initial and final consonant clusters are violations of English.
- snirb: only the final consonant cluster is not possible in English.

These words are two degrees removed from P.E.

Messer’s construction of P.E. and I.E. words was generated by using the Whorfian formula. The list of 8 pairs of words used were as follows:

<table>
<thead>
<tr>
<th>Possible English (PE)</th>
<th>Impossible English (IE)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group I</strong></td>
<td></td>
</tr>
<tr>
<td>PE</td>
<td>IE</td>
</tr>
<tr>
<td>nardz</td>
<td>zardz</td>
</tr>
<tr>
<td>frul</td>
<td>mrul</td>
</tr>
<tr>
<td>shrib</td>
<td>shkib</td>
</tr>
<tr>
<td>sprejt</td>
<td>spwejt</td>
</tr>
<tr>
<td><strong>Group II</strong></td>
<td></td>
</tr>
</tbody>
</table>


To evoke response, eight pictures of imaginary creatures were presented with each of the eight pairs of words which were written clearly in script on individual cards. The subject was asked to choose one of a pair of names for each imaginary creature, to give reasons for his choice, to state which word was easier to say, or read, and why this was so.

The Reading Miscue Inventory (Burke & Y. Goodman, 1971) was a guide selected for coding and counting the miscues generated by the subjects from the reading material. The guide provides definitions of specific types of miscue, examples at various linguistic levels (morpheme, word, phrase and sentence levels), and a detailed marking system. This made it possible to mark consistently and provide a basis for subsequent analysis.

The reasons for using the Reading Miscue Inventory were

1. the quality of the guide, itself, which has clear and discrete categories, based on linguistic principles; and

2. it is based on a theoretical view of reading as a psycholinguistic process; and

3. the results of this study could be compared with the results of other miscue studies using the Goodman Miscue Analysis.

Reading behavior of subjects was investigated through the following materials and procedures:

1. the SORT was used as an indication of reading level;

2. each subject read from a trade book, its level determined by the Spache Readability formula; and
3. the Goodman Reading Miscue Inventory was used to count and code miscues generated. Children were asked to retell and, or, answer questions, in relation to the story, as further evidence of their comprehension.

The Goodman Taxonomy of Miscues. The taxonomy examines graphic, phonological, syntactic and semantic aspects of the observed and expected responses. It records whether an attempt was made to correct the miscue and the kind of dissonance recognized that called for correction. The components of the taxonomy particularly relevant to this study are those related to semantic acceptability, syntactic acceptability, grapho-phonic information, and corrections. Definition of the categories and examples from the Reading Miscue Inventory Manual will be found in Appendix C.

A variety of children's literature in the form of paper-back stories was used to generate oral reading miscues which were subsequently subjected to a psycholinguistic analysis. This provided data for describing the oral reading behavior of Group I and Group III.

Selecting suitable reading material presented some problems. The precocious readers, Group I, had chronological ages ranging from 5.4 to 6.3 and reading ages ranging from grade equivalent of 2.5 to 5.2. Using materials from basal readers was judged inappropriate for these subjects because it would not be consonant with (a) the normal pattern of the young children's language and (b) the content of the material was likely to be outside the interest and concept range of these young subjects.
A selection was made of trade books of the sort young children would enjoy having read to them. These were graded, using the Spache Readability Formula, and two or three were made available at each reading level so that the child might have some choice. The lists of books used and their reading level follows:

McCloskey, Robert, Lentil. (New York: Scholastic Book Services, 1969). Grade Level 5


Thayer, J., The Outside Cat. (England: Knight, Brockhampton Press, 1974). Grade Level 3


Class Inclusion and Logical Addition. The ability to form logical classes is recognized by Inhelder & Piaget (1964) as one indication of concrete-operational thinking. Piaget (1961) studied children between 4 and 7 years in order to determine their understanding that a class may be considered in terms of its parts, each class being included in the whole. This is the "inclusion" relation. In order to investigate a child's understanding of this relationship, Piaget used a box of
wooden beads, all of them brown, except for two, which were white. His goal was to find if the child could use the mental process of logic in order to conclude that the class of wooden beads included the class of brown beads and the class of white beads, then the class of wooden beads must be greater than either the class of brown beads or of white beads.

In order to assess the ability of subjects in this study, to understand the relation of inclusion, two tests were given:

1. class inclusion using red and blue wooden blocks and
2. logical addition in which the same concept was investigated using the class, pets, containing a set of four dogs and a set of two cats. In this test, there was no material provided, it was administered as a verbal test.

**Data Collection**

In Phase I of the study, subjects were identified and assigned to one of three groups, in relation to their C.A., M.A. and, for Group I and III, their reading grade equivalent. Teachers cooperated by identifying possible subjects using their personal knowledge of the children. The investigator listened to subjects reading from a book selected by the subjects from a selection of six provided. These books had reading levels of 1+ to 3+ grades on a Spache Readability Formula. The subject's performance determined whether or not he should be given a SORT to determine his reading level. The minimum score was set at 2.0. To those subjects meeting the reading criteria the Slossen Intelligence Test was administered to determine mental age.
During this first Phase, when children were examining and reading books, the investigator discussed with them informally, and elicited responses in relation to:

1. **Attitudes to reading**, through questions such as: Do you like reading? Which book do you like best? Why?

2. **Understanding the purpose and function of reading**, through questions such as: Why do people read? What do you use books for? What do grown-ups use books for?

3. **Understanding the processes involved in reading**, through questions, such as: How did you learn to read? Could you teach a younger child to read? What do you do if you don't know a word?

An example of the nature of these discussions is provided as a part of a complete transcript given in Appendix B.

During Phase 2 the investigator interviewed each child on at least two, and as many as four occasions. The number of interviews was determined by the responsiveness of the subject which was affected by:

- **interest** — the child had much to say and the investigator could follow up many leads; or conversely, he would be slow to respond, and the investigator would spend a lot of time on one part of the interview.

- **fatigue** — the child might tire very quickly on a particular occasion.
distraction -- although the child and the interviewer were alone in a separate room, occasional distractions occurred.

time -- other unscheduled events occurred; e.g., on one occasion a musician arrived; on another, there was a fire drill.

On each occasion the investigator took the subject to a small room, apart from the classroom. All the subjects were interested in the tape recorder and helped test it to ensure that it was working and asked to hear themselves recorded on the tape. A pleasant, easy, unpressured atmosphere was established to insure that no child felt apprehensive, or insecure in the situation.

The "Concepts of Print" Test was administered first. Subjects were shown the paper-back book and told that it was a somewhat strange book, so that they would not be thrown by such peculiarities as an upside-down picture or page of text.

The investigator handed the book to the child and observed how he handled it. This was part of the test - to determine the concept of "book," where to begin and the direction in which to go. The non-readers in Group II listened as the story was read to them, joining in as they wished, commenting on the story and the pictures, obviously interested. The test was administered by interpolating questions relating to the test items, e.g., "Show me where to begin reading. Where do I begin?" (Item 2, Appendix B). "Could you point to the words on this page while I read them?" (Item 6) "What's wrong with this?" (Item 10, lines of text reversed).
The investigator followed leads given by the subjects to probe further into their thinking. For example, the text read "I sat the in hole and I splashed my with feet." Many subjects commented on this and remarked that it was strange or "funny." On one occasion, the investigator re-read "And I splashed my with feet" and asked, "What would you say?" The subject said, "And I splashed in my hole." He indicated that his point of attention was directed to the meaning rather than the written array.

Groups I and III were subjects who could read and they were invited to read the book themselves. They were given any help they needed for reading it. Many of Clay's testing points were inherent in the act of reading, e.g., directionality and the print, not picture, tell the story (Clay, 1972, p. 5). These points were recorded on the check sheet but not asked specifically. Subjects discussed particular points spontaneously. Where they failed to notice specific detail relating to the test, their attention was drawn to it and their comments invited; e.g., on page 13, there are changes in the order of letters within some words, such as, hill (hill), house (house). Some subjects read these as if they were real words (e.g., wsim was made into wesim) while others read them as if they were written conventionally (e.g., wesim was read as swim). In all cases the subjects were invited to look back at the text, to comment on and to discuss any peculiarities. The investigator endeavored to follow the subject's line of thought, to let them tell things that interested them, and give their own examples to make clear what their thinking was. A great deal of information was given in discussion engendered in response to the test
Items relating to punctuation. The question, "What's this?" indicating a question mark was asked (Item 15). Some subjects discussed question and answer, using the example in the book. Others gave their own examples of questions; some showed evidence of understanding the link between intonation and punctuation, demonstrated in terms of exclamation marks as well as question. Others tried to explain the difference the type of punctuation made to the sentence. The investigator displayed great interest in the discussion interjecting further questions as appropriate.

Phonological Studies. Each subject was told that the investigator would like to show him pictures of imaginary creatures and ask him to select one of two names for each creature. Each picture was shown separately. Two cards printed with stimulus words were out beside them. Groups I and III were invited first to read the names. The investigator read the names to Group II subjects, the non-readers. The subjects were asked

1. to choose a name and give a reason for their choice,
2. to indicate which word was easier to say or to read, and
3. to discuss why they thought it was easier.

Categories were made ex post facto by the investigator from the responses obtained from the subjects. Responses fell clearly into three categories:

1. recognition of implicit phonology
2. ability to relate stimulus words to other words; e.g., spranc begins the same as spring
3. some indication of unusual consonant clusters; e.g., sprejt and spwejt - recognition that w in spwejt made it difficult to say, or read.

Scoring: Category 1 scored 1 point
Category 2 scored 2 points
Category 3 scored 3 points

The maximum scoring was a total of 6, since ability to respond at each level was counted, not the number of individual responses.

Selection of Stories. The reading level of each subject was already established by SORT and two or three books at that level were offered the subject from which he made a selection. If it became apparent while reading that the selection was too difficult, too easy, or the reader found it uninteresting, then, a further selection was made. Some of the subjects found sustained reading tiring and examined the number of pages remaining and stated that they were getting tired. In some instances there was a break, sometimes the subject needed encouragement to go further. The investigator made judgments about whether and how to proceed, and whether to continue on another occasion. An example of this is found in the behavior of Robby, a boy in kindergarten, who was unused to any sustained reading at his level which was fourth grade. Three attempts to record his oral reading were made using different stories each time, with the boy refusing very positively to go beyond the first page. At one point he offered his thirteen year old sister, who was a good reader, as substitute! Eventually, he began reading McCloskey's Lentil with his own teacher, and continued
with the investigator, to read this long story through to the end with great enjoyment, evidenced by the chuckles and relish with which he read.

**Recording Procedures for Oral Reading.** Each subject was told the purpose of the reading, that no help would be given, and that he would be asked to retell the story. As each subject read, he was recorded on audio tape and the investigator noted miscues on a duplicate manuscript.

At the end of the story each subject was asked to retell the story. Questions were asked to check on specific points in the story, or to clarify and assist the retelling. An example of the retelling of a story and further questioning will be found in the complete transcript in Appendix B.

**Coding Miscues.** The recordings of subjects' reading was replayed until each miscue was identified precisely. The investigator was assisted at this stage by two graduate students. This allowed for consideration of the more complex miscues and greater precision in coding and analyzing the miscues in accordance with *The Goodman Taxonomy of Reading Miscues*, which was followed closely.

**Class Inclusion and Logical Addition.** These tasks were administered as follows:

At the end of the second interview session, the experimenter showed the subject a box containing 14 wooden blocks, 9 of which were red, and five blue. The investigator established that the subject knew the blocks were made of wood, that some were blue and some were red.
The subject was then asked
1. "Are there more red blocks or more blue blocks?"
2. "Are there more red blocks or more wooden blocks?"
3. "What makes you think that?"

A score of 6 points could be made as follows:
1 point for a correct answer to Number 1
2 points for a correct answer to Number 2
3 points for an answer to Number 3 that made clear the fact that
the child understood the inclusion relation. For example, "The red
ones and the blue one are all made of wood so there must be more
wooden ones."

Task 2, logical addition, was conducted verbally, using no visual
material. The subject was told, "I have a friend with four dogs and
two cats as pets." He was then asked three questions as follows:
1. Did she have more dogs or more cats?
2. Did she have more dogs or more pets?
3. Why do you think that?

Again, a score of 6 points could be made as for Task 1. The
answer to Number 3 must make clear that the inclusion relationship was
understood. For example, "There were only four dogs and if you count
the two cats there'd be 6 animals so there must be more pets." Some
subjects found it difficult to cope with the numbers involved. This
is in accord with Piaget's findings that logical classification
precedes a full understanding of numerical classes.

Responses to the three questions in each of the two tasks were
scored as follows: question 1 scored 1 point; question 2, 2 points;
question 3, 3 points. This made a maximum score of 12 points.
This chapter has described the population of subjects studied in this investigation and the procedures used to select them. The instrumentation used and the method of collecting data have been demonstrated. This last section describes the treatment of the data.

**Analysis of the Data**

The analysis of data centered on categorization of the subjects' responses in regard to literacy and reading behavior. In addition to quantitative analysis, special attention was given to qualitative aspects - the levels or hierarchies of responses - which were apparent in the data.

**Attitudes, Purposes and Functions of Reading.** The following categories were formed from the data relating to purpose and functions.

1. **Purpose.** Responses fell into four categories:
   a) *instrumental*, e.g., "You can read the papers in your bubble gum."
   b) *informational*, e.g., "... to know about frogs and toads."
   c) *platitudinous*, e.g., "You learn to read so you can read books."
   d) *personal*, e.g., "Dad and mom want me to learn how to read." "I want to get smarter."

2. **Function.** This data emanated from children's statements about what they thought was involved in learning to read. All the groups made responses related to knowing words, letters and sounds. The data fell broadly into three categories.
   a) *Extraneous.* This included responses that were not relevant to reading, e.g., "You have to be quiet."
b) **Knowing words, letters and sounds.** Many responses fell into this category:

"You need to know the alphabet."

"Knowing what the words spell or say."

"Being told the words."

c) **Knowledge of rules.** Included here were responses that show generalizing from specifics to larger classifications:

"You need to know the rules."

"It's not just remembering words; you have to sound them, if you haven't seen them before or heard of them."

**Concepts Related to Written Language.** The "Concepts about Print" Test was treated as follows:

1. The test was scored using Clay's methodology and converting to a stanine score.

2. Categories were made ex post facto from the subjects' protocols, organizing their responses in six parts; viz., question marks, period, exclamation marks, capitalization, and sentence. Within each part the investigator identified a range of responses, indicating three levels of operative knowing:

a) Simple recognition, e.g., "It's a question mark."

b) Simple definition or example, e.g., "I know it's question because it's asking something, like 'Could I jump on this?'"
c) Evidence of further understanding, e.g., "You can't hear question marks when you talk but you can sometimes find out if it's a question if it starts with 'could' or 'is'."

Responses in level 1 were assigned a numerical value of one; those in level 2 a value of two; and those in level 3 a value of three.

**Phonological Studies.** Subjects' responses fell into three levels:

1. choice of the more "possible" word.
2. ability to give an example of a word using the same consonant cluster, e.g., spranc - "it begins the same as spring."
3. explicit knowledge of the constraints inherent in language, e.g., spwafc - "there should be an e between the p and the w."

Responses were assigned a numerical weighting similar to the above category with level 1 receiving one point; level 2, two; and level 3, three points.

**Reaction to the Discrepancies in the Text of "Sand."** Analysis centered on responses related to syntax and position errors in words.

1. Syntactic responses were grouped as follows:
   a) the discrepancy was read by the subject as if the syntax were correct,
   b) the discrepancy was noticed and corrected,
   c) the discrepancy was noticed but the subject was unable to correct,
   d) the subject read word for word and failed to notice the discrepancy,
e) the subject corrected semantically using the picture cues only.

2. Position errors in words responses included reaction to upside down text and to discrepancy in letter order within words and were categorized as follows:
   a) words were read as if correctly written,
   b) some position errors were noticed and corrected,
   c) some position errors were noticed and the subject was unable to correct them.

Data from this section was not assigned a numerical rating.

The Goodman Miscue Inventory. An analysis of each subjects' oral reading behavior was made according to the Goodman Taxonomy of Reading Miscues. Data was isolated relating to particular types of miscues and behaviors; viz.,

1. the number of miscues per hundred words (MPHW)
2. corrected miscues
3. semantic acceptability
4. syntactic acceptability
5. comprehending score
6. grapho-phonemic proximity
7. residual miscues per hundred words (RMPHW)

Identification and coding of the miscues was done in careful accordance with the guidelines provided by Burke & Y. Goodman (1971) in the Reading Miscue Inventory Teacher's Manual (pp. 28-40) with the assistance of two informed graduate students at Ohio State University. Each tape was transcribed, coded by the investigator and again by the
investigator and a graduate student. The tapes were listened to
again, as specific data was being analyzed.

The first 50 miscues constituted the sample for eleven subjects.
Three subjects made fewer than 50 miscues and all of their miscues
were coded. The miscue data for each child was assembled. A multi-
variate profile was made from the means of each group in order to
detect any patterns within the group as a whole and to find any evi-
dence of clustering performance.

A multivariate profile was assembled from the means of variables
relating to personal data of the subjects and the independent variables
categorized within the data obtained from probing literacy concepts.
These profiles facilitated searching for any patterns in the data,
relating to the group as a whole, and the clustering performance, as
well as evidence of discrepancies between individual groups on any
single measure that would need statistical treatment.

Two multivariate profiles showing the clustering of data pertaining
to (1) concepts of literacy and (2) individual performance and
group means, are included and discussed in Chapter IV.

Finally, a discussion of data pertaining to each child is
assembled to form individual profiles, to give evidence of their
different kinds of knowing. These profiles will provide some of the
"flavor" of the children's own learning. An analysis and discussion
of the data follows in Chapter IV.
CHAPTER IV

Analysis of the Data

Introduction

The purpose of this study was to investigate subjects' thinking processes as they engaged in activities and discussion related to reading and writing. The investigator sought evidence of the organizational structures or schemes, that underlay performance. Data were collected through informal discussions and specific tasks, such as responding to a series of nonsense words, reading a text that included deliberate discrepancies, and a miscue inventory of oral reading. All verbal responses were tape recorded and transcribed for the analysis presented here. The investigator focused on evidence of the range of figurative and operative knowing of individuals within and across the three groups of subjects studied. Both quantitative and qualitative aspects of the data were considered in the analysis, in regard to the subjects' (1) attitude toward reading and their understanding of its purposes and functions; (2) understanding of literacy concepts; and (3) proficiency in reading as revealed by the reading miscue inventory. Evidence was sought within the data of similarities and differences in explicit understanding of literacy concepts between (1) reading and non-reading subjects of similar mental and chronological age, and (2) younger and older reading subjects of similar mental age but different chronological age.
Data for each of the three concerns listed will be given followed by profile data on the individual subjects.

**Attitudes, Purpose and Function in Relation to Reading**

Data relative to children's attitudes toward reading and their knowledge of the purposes and functions of reading were obtained from tape recorded informal interviews. The purpose of these dialogues was to ascertain the children's (1) attitudes toward reading; (2) understanding of the purposes and functions of reading; and (3) insight into the reading process, i.e., their understanding of what is involved in learning-to-read.

**Attitudes**

Children's attitudes generally were positive towards reading. There were two exceptions, both in the group of precocious readers. Noel did not like reading "too much" and Alec thought it was "boring," a surprising statement since he was reading at a 4.8 grade level.

Four of Group I named books they enjoyed reading. They ranged from *The Cat in the Hat* to *James and the Giant Peach*. Two subjects had "a whole shelf of books" at home, but could not remember any names or nominate a favorite book. One boy liked books about nature and he had got some of these from the library. Two children reported that they read the same book many times. Laurie, for example, talked of one book with seventy-two pages, which she read every day. She explained some of the difficulties she had met, and overcome,

"... and the only ones that I sometimes get mixed up on is two [words], and now I can get them straight. They were *eat* and *at* ... They look the same. I thought *at* was *cat* and *eat* was *at.**
The non-readers (Group II) also thought reading was enjoyable. Three of them could name books they liked: *Green Eggs and Ham*, *Alligators Are Dangerous*, and *Benjamin and the Wolf*. The latter one was especially enjoyed by Ben because "it has my name in it."

Four of the subjects talked about the pictures in books, relating to animals, people and houses. Cathy liked "little books" and Mickey liked books with pictures and said the problem with reading them was that she "just didn't know the words."

All the subjects in Group III could name a book they liked and could talk about it to some extent. Their reading included *The Little House on the Prairie*, *Duffy and the Devil*, and *Curious George*. Kevin liked "old fashioned books" about Davy Crockett, Daniel Boone, and Tom Sawyer. Two boys liked adventure stories and grown-up books about airplanes. One boy belonged to a book club and had two favorite books, *Oscar, the Otter* and *Big Max*. Jo talked about a favorite book that had her name in it and one with a character called "Mrs. Dibbleton Downey" which amused Jo greatly and whose name she loved to say.

There was evidence of a positive attitude to reading, of acquaintance with books, and of being read to. The older children, Group III, had more knowledge of specific books, and the books they knew included more sophisticated titles than those known in the younger subjects.

**Purpose and Function**

Children's understanding of the purpose of reading, what use it was, ranged from platitudinous, imitative, other-directed reasons, such as "Your dad and mom want you to;" to its functional value as a source of information. Many of the responses, particularly in Group II
were very personal, e.g., "You learn to read so your mom and dad won't have to read to you," or "... in case your parents start forgetting how to read."

TABLE 2

Number of Responses Regarding Purposes for Reading
In Four Categories for Precocious Readers,
Non-readers, and Older Readers

<table>
<thead>
<tr>
<th></th>
<th>Group I Precocious Readers</th>
<th>Group II Non-readers</th>
<th>Group III Older Readers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal</td>
<td>2</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Platitudinous</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Instrumental</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Informative</td>
<td>2</td>
<td>2</td>
<td>9</td>
</tr>
</tbody>
</table>

A subject in Group I wanted to be able to read so that when he learned to write, he would be able to read what he had written! As can be seen in Table 2, the non-reading group gave more personal and platitudinous responses than either the precocious readers, or Group III, the older readers. There is a marked shift in the responses of Group III towards a more objective understanding of the purpose for reading. Responses categorized as informational included, "to know about frogs and toads," "for learning science and math, and counting," "it's fun to read old-fashioned books," "to tell you how to do things like making boats in Curious George."
The category, instrumental, included responses that indicated an understanding of the functional aspects of reading, its value in helping one to get things done. Examples in this category include, "reading the prices" in stores and getting the right things when shopping. One of these latter examples was accompanied by a cautionary tale about a man who could not read going to the store with a shopping list and buying Reynold's Wrap instead of spaghetti, and sugar instead of salt. Ricky in Group I stated that if you could not read you would not know what it said on the bubble gum wrappers. Two boys in Group III, gave as examples the need to be able to read signs such as "Wet Paint" and "Danger."

"... if there's a sign 'Wet Paint. Don't go past this line.' If you couldn't read, you'd get paint all over you."

"'Danger.' You'd have to read that 'cause it might be a ditch or something and you'd go right by it and something would happen."

The pattern of responses show a developmental trend. There is an increase in the operative aspects of the subjects' knowing as they assimilate from a widening range of experiences and extend their understanding of the purposes of reading from the purely personal and imitative to a more objective view.

Insight into the Reading Process

To get the subjects to reveal what they thought was involved in reading and learning to read, they were asked what they thought was important to know to be able to read, and how they would go about teaching another child. Their responses were categorized as (1) extraneous;
(2) knowledge that words and letters were involved in learning to read; (3) ability to make some generalizations.

Only two subjects, one from Group II, one from Group III, gave extraneous responses, e.g., "You have to sit quietly." Most subjects knew that it had something to do with words and letters, and sounding out words. Typical responses were:

"First they tell you a word, then you know how to say it."

"It's knowing all your letters, your ABC."

"Knowing what the words spell and say."

All the subjects in Group II, that is, the non-readers, knew that recognizing words was involved in reading. Mickey thought it was helpful for someone to "tell me how to read and say it first and then I'll say it." Cathy knew that "you have to think about the words" but could offer no further information. Stephen knew that Carlos began with C (letter name) and said, "I would have to try all the sounds of C (letter name), like /s/ or /k/ (phonemes) and write down the one that was /k/ (phoneme). The investigator asked, "Could you write C for Carlos just there?" Stephen could not do this.

Ben thought that learning to read involved "knowing what the words spell - I mean - what the letters spell - and what the words say." He gave evidence of early recognition of sound symbol relationship.

B: You have to say the sounds they make and then you can get the whole word together.

Q: Can you tell me any one you know like that?

B: Like B says book.
Q: How do you know that?

B: 'Cause you begin your name B E N (letter names). It's in your name.

Roger, also in Group II, on the threshold of reading, made the most explicit statement.

"You have to sound out the words and think what letter that sound is."

Subjects in Group I had little understanding of how they had learned to read. Most of them insisted they had learned by themselves. They said they would teach another child by telling him words, or sounding out words, which he would repeat. Four subjects in Group III could make a more generalizing statement. Kevin, for example, began by saying that basic to learning to read was "knowing your ABC." He said that reading was not just remembering all the words. He added,

"It's pretty hard. Sometimes, if you haven't seen them before - or heard of them - you have to sound them out - so you should know all the sounds of the alphabet."

Darren's responses reflected his greater school experience. He said,

"I'd tell them the rules - lots of stuff. I'd tell them what sound the letters make. Then I'd give them a test to see if they knew."

Most children's responses indicated that they had assimilated the basic idea that sound-symbol relationships were somehow involved in reading.

Three subjects recognized a need for feedback. For example, Scotty in Group I, told how if he did not know a word he would sound it out to his mother and she would tell him. Steven, in Group III, stated that, "You need someone to help." The way the responses were categorized is shown in Table 3.
TABLE 3
Categories of Response Relating to Subjects' Explicit Understanding of the Reading Process

<table>
<thead>
<tr>
<th>Response</th>
<th>Group I Precocious Readers</th>
<th>Group II Non-readers</th>
<th>Group III Older Readers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraneous</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Knowing, about words, letters, etc.</td>
<td>5</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Generalizing</td>
<td>0</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

Concepts of Written Language

Children's concepts within the written form of language were collected and analyzed in relation to the following: (1) concepts about print; (2) punctuation, capitalization, and sentences; (3) phonology; (4) discrepancies in the written form of language (in Sand), including (a) syntax and (b) lexical items. A relationship was sought between the subjects' reading ability and their explicit knowledge of these literacy concepts.

Concepts of Print

The subjects' understanding of the printed form of language as reflected in their responses to Clay's "Concepts of Print" test is shown in Table 4. Both the precocious readers and the older readers scored higher than the non-readers, with the older readers doing slightly better than the younger readers. Since this test was designed to reflect changes in reading skill during the first year of reading.
Instruction, these results were as expected with the non-readers showing a different pattern from the readers.

**TABLE 4**

Stanine Scores for Subjects on Concepts of Print Test

<table>
<thead>
<tr>
<th>Test Score:</th>
<th>0</th>
<th>1-4</th>
<th>5-7</th>
<th>8-11</th>
<th>12-14</th>
<th>15-17</th>
<th>18-20</th>
<th>21-22</th>
<th>23-24</th>
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<tbody>
<tr>
<td>Stanine</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

Subjects:

<table>
<thead>
<tr>
<th>Group 1</th>
<th></th>
<th></th>
<th></th>
<th>2</th>
<th>2</th>
<th>3</th>
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<tbody>
<tr>
<td>Group II</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group III</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Three of the items in the test concerned recognition of punctuation marks which Clay (1972, p. 12) found are acquired later. She found that only 50 per cent of the subjects at age seven responded correctly to those items that included knowledge about the period, commas, and quotation marks.

In this study all subjects in Groups I and III, and three in Group II could name a period. Three precocious readers and two older readers had some knowledge of all the items in the test except the comma.

**Concepts of Capitalization, Punctuation, and Sentence**

The booklet, Sand, provided the basis for further probing of subjects' concepts of the written form of language; viz., (1) question
mark, (2) period, (3) quotation marks, (4) exclamation marks, (5) capital letters, and (6) sentence. As the responses were examined, three stages were discernable and became the basis for classifying the responses. These were (1) simple recognition, (2) simple definition plus an example, and (3) evidence of further knowledge.

Responses as they were categorized for each individual, within the three groups, are shown in Table 5. The three levels of response were assigned a numerical value of 1, 2, and 3 which formed the quantitative data, the numerical total, in the last column. If Level 1 represents minimal response or recognition, mainly figural knowing, it is apparent from Table 5 that all subjects in Groups I and III have some acquaintance with question marks, periods and capital letters. In Group II, the non-readers, two subjects indicate recognition of question mark and capital letters and three recognize a period. One child had some knowledge of exclamation marks and another of sentence. Group III subjects gave two more instances of second stage responses than Group I subjects. There were no Level 3 responses from Group I, but four responses at this level were given by subjects in Group III.

The responses ranged from mainly figurative (Level 1) to high level operative knowing. For example, Cathy in Group II, recognized a question mark because "my dad says that's what question marks look like." This was a Level 1, a figurative response. Evidence of developing operative structures was apparent in the Level 2 responses. Subjects from Groups I and III gave examples, using intonation for clarification. Ricky wrote **cracc** (crackers), the name of his favorite food,
TABLE 5

Subjects' Responses at Three Levels to Concepts of Six Items of Written Language

<table>
<thead>
<tr>
<th>Subjects:</th>
<th>Question Marks</th>
<th>Period Marks</th>
<th>Quotation Exclamation Marks</th>
<th>Letters Capital, etc.</th>
<th>Sentence Marks</th>
<th>Summary by Levels</th>
<th>Numerical Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3</td>
<td>1 2</td>
<td>1 2 3 1 2</td>
<td>1 2 3 1 2 3</td>
<td>1 2 3</td>
<td>1 2 3</td>
<td></td>
</tr>
<tr>
<td>Group I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Robert</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>2</td>
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<tr>
<td>Ricky</td>
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<td>✓</td>
<td>✓</td>
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<td>✓</td>
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<td>2</td>
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<td>Scotty</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>4</td>
<td>10</td>
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<td>Laurie</td>
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<td>✓</td>
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<td>15</td>
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<tr>
<td>Maureen</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Group III</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steven</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>4</td>
<td>8</td>
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<td>Billy</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>10</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>3</td>
<td>3</td>
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<td>Kathy</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>3</td>
</tr>
<tr>
<td>Darren</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>Jo</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>4</td>
<td>17</td>
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<tr>
<td>Kevin</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>5</td>
<td>21</td>
</tr>
<tr>
<td>Group II</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ben</td>
<td></td>
<td></td>
<td></td>
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<td>✓</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Stephanie</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Roger</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Stephen</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Micky</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>0</td>
<td>0</td>
</tr>
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<td>Kris</td>
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<td></td>
<td>✓</td>
<td>✓</td>
<td>0</td>
<td>0</td>
</tr>
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<td>Cathy</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>
and first, put a question mark after it, demonstrated how he would read it, with exaggerated questioning intonation. He then erased the question mark and replaced it with an exclamation mark. He associated an exclamation with loudness, and was at pains to get the right volume for exclamations. Finally, he changed the exclamation mark for a period, remarking that now it was a sentence because, "I don't want to say it exciting."

Laurie, also in Group I, demonstrated her understanding of quotation marks by cupping her hands, and calling, "Home-time," adding that it needed to be said "softly, from far away." Kevin, in Group III whose responses were among the most mature, explained that exclamations could have one or two words and that "... you go real loud." Jo, in Group III, explained how exclamation marks "make the story exciting." She added, "It gets real loud." She was asked if she ever used one in her own writing. She replied, "Yes, sometimes - like if I wrote a story about somebody getting lost, I'd say, 'The little girl was lost!' with an exclamation mark and a period."

The term sentence was totally unfamiliar to all but six subjects. For the most of those who knew the term, it was connected with the fact that a sentence began with a capital letter. When asked to read or show a sentence in Sand, a confusion between line and sentence was revealed. Laurie, in Group I revealed her operative structures when she talked about sentence:

"A sentence? - When I was a little baby I only said 'Mama' and 'Can I play?' but then I started to make sentences, and as I grew older I made sentences and ... I put punctuation marks and question marks. And then, when I'm writing,
like this guy was (indicating Sand) I had to
write nicely with straight letters, just like
adults and you."

The response that indicated the highest level of knowing about
sentences was given by Kevin in Group III.

"A sentence? It's something where you're
telling someone something — like 'I go home
from school at 3:40 on the bus.'"

Kevin read a sentence from the book and said he knew it was a sentence
because "There's a period there and a period there; so I knew a new
one (sentence) would start there." Kevin shows evidence of having
assimilated a range of information to his scheme of sentence. It is
clearly preconceptual since it is still dependant on the image, on its
place between two periods. The concept of sentence is complex.

Steven, in Group III, talked glibly about sentences and punctuation.
The figurative and operative aspects of his knowing can be clearly
discerned. He began by describing three lines of print he read from
his book as three sentences, and continued with the investigator as
follows:

S: I'll tell you an exclamation point. Fire!
     (shouted) (He wrote Fire! carefully.)

S: I've put an exclamation point.

I: If you put, "I'm going to light the fire
today," would you put an exclamation mark
after fire then?

S: No. Because that's an asking sentence.

I: (repeated sentence) Is that really an asking
sentence?

S: Yes. O.K. Now I'll tell you what a question is.
"Is the sun out?" (asked with exaggerated question-
ing intonation) (Steven carefully wrote the
sentence complete with question mark.)
S: Now I'll tell you what a period's for. (He wrote and said with the intonation of questioning, "Is the sun down."

I: Is that a different kind of sentence from "Is the sun out?"

S: No. It's just two letters different, like that. (He matched the words in the two sentences which were written underneath each other and drew a line after sun in each sentence.) Out and down are not the same. This one's an asking (indicating question mark) and this one's a telling (indicating period).

The strong figurative, imitative aspect of Steven's knowing about literacy concepts is apparent. He is using terms that he has heard, in the right context. His operative structures are low level and rudimentary but their presence is evident in his attempts to demonstrate them in his own examples.

All subjects in Groups I and III could identify the letters of the alphabet. In Group II, the non-reading group, two subjects identified all letters and five could identify some letters. Most subjects recognized the difference between Home and home, Time and time in terms of upper and lower case letters. Several subjects knew that capital letters occurred at the beginning though they were not always sure of what. Robert, in Group I, thought they occurred at the beginning of a word, any word. Neither Scotty nor Alex, both fluent readers in Group I could give any comment beyond, "Some letters are capital and some ... are little."

Five of the non-readers in Group II focussed mainly on the configuration of the letter, for example,

"Well this (h) has a line and half of an n and this one (H) has two big lines and a line across."
They are different because it kind of sounds different."

Roger, the most knowledgeable in Group II, called them "big H and little h" and said, "you start a sentence with a capital letter."

All subjects in Group III referred to the need for capital letters at the beginning of sentences. Darren and Kevin gave further examples of using capital letters, for people's names, and the names of states. Asked why Mother in the text began with a capital letter, Darren said, "They're using mother for her name."

It was apparent that subjects revealed a wide range of knowing, ranging from the mainly figurative act of identification, through verbal knowing that capital letters occur at the beginning of something referred to as a sentence. Only two subjects, both in Group III, responded at Level 3.

**Phonological Studies**

The purpose in this test was to seek evidence of any shift in children's implicit knowledge of phonology (already established in Messer's [1967] study) towards implicit and explicit understanding of similar phonological constraints in written language.

Responses were categorized as falling into three levels:

1. recognition of phonological constraints inherent in the English language, judged by the subjects' choice of possible or impossible English words.

2. awareness of similar clusters in other words, e.g., "spranc is like spring"
3. ability to be explicit about the phonological constraints in written language, e.g., "there's hardly any word that begins with spw."

First level responses were given by all subjects, who chose between 5 and 8 possible English words. There was no difference at this level among the three groups. Differences at Levels 2 and 3 were apparent however. The highest number of responses from one child was 10, at Level 3, made by Rick in Group 1. Examples of these Level 3 responses were

"Flamp is easier to say. Fwavp has a v in it and I can't say fwa very well."

"Sprejt has a r instead of a w (spwejt) so it's easier to say, and I love r's better than w's."

Table 6 shows the number of responses made at each level by each subject. A weighting was given to each level of response. Level 1 scored one point, Level 2 scored two points and Level 3 scored three points. A maximum score was six points and this indicated that the subject scored at all levels.

Responses to Syntactic Discrepancies in Written Language

Analysis of the responses to the discrepancies in syntax confronted in Sand revealed three types of response, as follows:

1. subject noticed discrepancies in syntax, but was unable to reorder it; e.g.,

   Text:  I splashed my with feet.
   Subject: I splashed my feet with.  
   I splashed my wet feet.
# TABLE 6

Levels of Response of Individuals Related to Implicit Phonology and Graphic Representations

<table>
<thead>
<tr>
<th>Score for Response Level</th>
<th>Levels of Response</th>
<th>Max. Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 pt.</td>
<td>2 pts.</td>
</tr>
<tr>
<td><strong>1</strong></td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

**Group I**

<table>
<thead>
<tr>
<th>Name</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robert</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Noel</td>
<td>6</td>
<td>0</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Ricky</td>
<td>6</td>
<td>1</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Alec</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Scotty</td>
<td>6</td>
<td>0</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Laurie</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Maureen</td>
<td>7</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

**Group III**

<table>
<thead>
<tr>
<th>Name</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steven</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Kathy</td>
<td>7</td>
<td>0</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Mary</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Milly</td>
<td>7</td>
<td>0</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Darrec</td>
<td>7</td>
<td>4</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Jo</td>
<td>7</td>
<td>1</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Kevin</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

**Group II**

<table>
<thead>
<tr>
<th>Name</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ben</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Stephanie</td>
<td>6</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Roger</td>
<td>8</td>
<td>1</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Stephen</td>
<td>7</td>
<td>1</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Micky</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Chris</td>
<td>7</td>
<td>-</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Cathy</td>
<td>6</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

*Level 1 - Recognition of Possible/Impossible English Words
Level 2 - Awareness of Similar Clusters of Letters in Other Words
Level 3 - Explicit About
2. subject was immediately aware of something wrong; e.g.,

Text: I sat in the sand...

Subject: I sat ... I sat ... I sat ... (stopped, muttered, "I could have sworn ...") stated, "I think they should have had it the other way." (in the).

3. subject read the text as if there was no discrepancy.

Table 7 shows the pattern of responses for the subjects in each group.

**TABLE 7**

**Pattern of Individual Responses to Categories of Discrepancies in Syntax**

<table>
<thead>
<tr>
<th>Categories</th>
<th>Subjects</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group I</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Robert</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noel</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Ricky</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alex</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scotty</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laurie</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maureen</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Group III</strong></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steven</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Kathy</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mary</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milly</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Darren</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jo</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kevin</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data from the non-readers, Group II, was gathered as they observed the text and responded while the story was read to them.

Three members of this group did not respond to the syntactic
discrepancies. Two subjects noticed the change in syntax and remarked, "It sounds funny." They could 'make it right' and used the picture as a clue to their own meaning. For example,

Text: I splashed my with feet.

Subject: I splashed with my hands, or I splashed with my slippery feet.

Responses to Transformed Text

Discrepancies in the graphic representation in the text included upside down lines and letter position errors in words; for example,

I sat ni eth hole

and I wondered.

Could a boat float here?

Could a whale wsim here?

Shall I mkae a hil

wth a coconut tree

and a huose for me

and a yelolw star-fish?

Data for Groups I and III were analyzed for the following type responses: (1) subjects who read the upside down text in that position, (2) subjects who read correctly page 14 in Sand (above) without noting the position errors of letters in words, and (3) subjects who were able to correct at least four words. Table 8 shows the pattern of response for the subjects in the two groups.
TABLE 8
Response to Upside Down Text and Position Errors in Words

<table>
<thead>
<tr>
<th>Read Upside Down Text</th>
<th>Position Errors in Words</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Attention to Errors</td>
</tr>
<tr>
<td>Group I</td>
<td></td>
</tr>
<tr>
<td>Robert</td>
<td>X</td>
</tr>
<tr>
<td>Noel</td>
<td></td>
</tr>
<tr>
<td>Ricky</td>
<td>X</td>
</tr>
<tr>
<td>Alex</td>
<td></td>
</tr>
<tr>
<td>Scotty</td>
<td></td>
</tr>
<tr>
<td>Laurie</td>
<td>X</td>
</tr>
<tr>
<td>Maureen</td>
<td></td>
</tr>
<tr>
<td>Group II</td>
<td></td>
</tr>
<tr>
<td>Steven</td>
<td>X (½)</td>
</tr>
<tr>
<td>Milly</td>
<td></td>
</tr>
<tr>
<td>Mary</td>
<td>X</td>
</tr>
<tr>
<td>Kathy</td>
<td></td>
</tr>
<tr>
<td>Darren</td>
<td>X</td>
</tr>
<tr>
<td>Jo</td>
<td>X</td>
</tr>
<tr>
<td>Kevin</td>
<td>X</td>
</tr>
</tbody>
</table>

Responses to the upside down text ranged from subjects who stopped and turned the book to those who were amused at finding a page of text upside down and who opted to read it without returning it to the normal position. They seemed to have no difficulty in doing this, particularly after the first two words. The reading gathered momentum as they predicted likely text. Darren in Group III offered an explanation of how this was achieved. He asked the investigator, "Does that look upside down to you?" (pointing to a word in a sentence) "It doesn't look upside down to me."
Table 8 shows that three subjects in Group I and four in Group III read the reversed text with no problems.

Similarly six readers in Group I and five in Group III, read the text containing words with position errors as if there were no discrepancies. Three subjects in Group I and one in Group III read _ne_ (neither) as one word _neither_ or _neath_. Subjects who had no difficulty with syntax, and who read other scrambled words as if correct, had great difficulty reorganizing the letters in just those two words. Robert, for example, with a great deal of help, could not make _neither_. He seemed unable to hold the parts in his mind, even though he could say, "Change them round." Eventually, he wrote them down and read them correctly.

_wsIm_ (swim) gave rise to some interesting comments. Two subjects in Group I and one in Group III read it as _wesim_ and were content to leave it that way. Lauren read it as _swim_, and when invited to look at it again remarked that it began with a "silent w." Robert said he knew it was _swim_ because "... it had an _i_ there." Noel was more interested in the content of the question asked in the text as to whether a whale could swim there.

Children in both groups who in discussion made clear that they knew there were discrepancies in the spelling, actually read the text as if it were correct. It was apparent that like Kolers' (1973) skilled readers, familiar words were perceived as wholes not as piecemeal by the subjects. Table 8 shows the particular categories into which responses fell. Although some subjects had difficulties with some
words, particularly neither the first ones to be dealt with, there were no subjects who were unable to deal with some of the discrepancies within words.

A Composite of Data Related to Children's Concepts of Written Language

Profiles of Group Means. This research study supported the theory that reading is a complex process in which different kinds of learning are cognitively fused. In order to examine the data in regard to patterning of behavior over the range of variables selected as components of developing literacy, a multivariate profile was assembled. The means of seven variables were organized for each group so that comparisons could be made across the three groups. Two of the variables were chronological and mental age, and a third was tests of inclusion and logical addition because, according to Piaget, ability in this area is indicative of concrete operational structures. The remaining variables were reading level, concepts of print, phonology and punctuation/capitalization.

Chart 1 shows the patterning formed by the means of the variables, for all three groups. Information relating to Group I was used as a basis to contrast the other groups.

Group II has similar controlled variables to Group I relating to chronological and mental age. Examination of the profile revealed that Group II differed from Group I in all other respects. It was apparent that Group II behaved differently from either of the other groups and that Group III and Group I more closely approximated each other in five of the seven variables. If concepts of print, phonology
and punctuation are functions of reading and of written language; then it could be expected that Group I would behave in a way more similar to Group III.

**CHART 1**

A Multivariate Profile Showing The Means for Each of Three Groups on Seven Variables

<table>
<thead>
<tr>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.A.</td>
<td>M.A.</td>
<td>Inclusion</td>
</tr>
<tr>
<td>Reading Level</td>
<td>Concepts of Print</td>
<td>Phonology</td>
</tr>
<tr>
<td>Punctuation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The profile shows a different dispersion between variables 3 and 4. If logical inclusion were the key variable for ability in reading and concepts of literacy, the pattern formed at point 3 on the chart would continue but in fact Group II can be seen to be discrepant. It is not possible to predict the performance on the variables concerned with literacy simply from the results of the logical inclusion tasks. The variable that logically shows a wide dispersion is reading level. Therefore reading is the key variable that explains performance on reading related tasks.

For Group III the controls with Group I were mental age and ability to read at least at second grade (2.0) level. A comparison of the patterns made by Groups I and III reveals that a higher level of scores on logical inclusion tasks was achieved by Group III, the older group. The reading levels approximate each other, as do the concepts concerned with print and phonology. The pattern changes somewhat in relation to punctuation and Group III shows some superiority.

The question might be raised as to whether reading ability caused some degree of competence in the three component literacy skills, or whether competence in phonology, concepts of print and punctuation were responsible for reading ability. The literature supports the view that such components are learned in the use of the written form of language (Reid 1966, Downing 1970, Clay 1969). If direct learning of these particular skills had been found to influence reading, it is likely that they would long since have been incorporated into
early reading instruction. The profile shows a correlation between reading ability and the selected concepts of literacy, but it does not show causality. It also shows a developmental trend with Group III slightly ahead on concepts related to literacy. The standard deviations in phonology and punctuation, however, suggest differences within the groups that should be examined. The standard deviations are shown in Table 9.

**Patterning of Individual Scores.** Information pertaining to individuals in each group was assembled into a second multivariate profile, Chart 2. An examination of this chart shows that Group III members consistently score high on logical inclusion but have a wide range of scores on variables five, six, and seven. Group I has a wide range of performance on variables six and seven with two subjects scoring as high as Group III on variable six and two subjects in Group III scoring as low as Group I.

The range of scores on variable six, phonology, is narrower than on variable seven, punctuation, which is only available within the written form of language. Although there is some overlap among the groups, it is apparent that subjects in Group III achieve the highest level of attainment.

Concepts of print, variable five, is not designed to discern differences in reading beyond the first year of instruction. It is designed as a diagnostic survey test to determine nonreaders' concepts of print, and progress during the first year. This is apparent in the scores. The items that were related to learning at age seven
### TABLE 9
The Range, Mean, and Standard Deviation for Three Groups in Four Variables: Reading Level, Concepts of Print, Phonology, and Punctuation

<table>
<thead>
<tr>
<th></th>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>2.5-5.2</td>
<td>0-6</td>
<td>2.3-6.2</td>
</tr>
<tr>
<td>Mean</td>
<td>4.1</td>
<td>-</td>
<td>3.8</td>
</tr>
<tr>
<td>SD</td>
<td>1.0</td>
<td>-</td>
<td>1.3</td>
</tr>
<tr>
<td>Concepts of Print</td>
<td>7-9</td>
<td>3-7</td>
<td>8-9</td>
</tr>
<tr>
<td>Mean</td>
<td>8.1</td>
<td>5.7</td>
<td>8.2</td>
</tr>
<tr>
<td>SD</td>
<td>.085</td>
<td>1.16</td>
<td>.535</td>
</tr>
<tr>
<td>Phonology</td>
<td>6-38</td>
<td>5-25</td>
<td>7-34</td>
</tr>
<tr>
<td>Mean</td>
<td>15.1</td>
<td>9.4</td>
<td>17.4</td>
</tr>
<tr>
<td>SD</td>
<td>11.6</td>
<td>9.3</td>
<td>6.6</td>
</tr>
<tr>
<td>Punctuation</td>
<td>2-15</td>
<td>0-12</td>
<td>2-21</td>
</tr>
<tr>
<td>Mean</td>
<td>8.1</td>
<td>2.9</td>
<td>10.7</td>
</tr>
<tr>
<td>SD</td>
<td>5.4</td>
<td>5.20</td>
<td>6.6</td>
</tr>
</tbody>
</table>
CHART 2
A Multivariate Profile Showing Individual Scores
For Subjects in Each of the Three Groups
on Seven Variables

<table>
<thead>
<tr>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
</tr>
</thead>
</table>

1. C.A.
2. M.A.
3. Inclusion
4. Reading Level
5. Concepts of Print
6. Phonology
7. Punctuation
(according to Clay), were the ones most often not known by subjects in this study. In fact, no subject could name commas and only five could name quotation marks.

Chart 2 indicates the wide range of scores within the three groups, and the considerable overlap between the groups. The general pattern seen in the means in Chart 1 is still significant and represents the likely trend if a wider population were to be investigated.

Evidence of Continuity in Learning

It is apparent that a wide range of personal, idiosyncratic, learning is taking place across the range of subjects as they extend their linguistic knowledge into literacy. Continuity in learning is apparent and this can best be demonstrated by considering two variables in this study, phonology and punctuation.

Phonology. All the subjects clearly distinguished between possible and impossible English words. Many of them indicated an awareness of words with similar consonant clusters. Children who made responses at the highest level were accommodation their linguistic schemes to the phonological constraints in written language. Four subjects in Group I and five in Group III, gave evidence of making this accommodation. It is worth noting that one subject in Group II gave strong evidence of making this shift towards understanding the phonological constraints inherent in written language. Three subjects in Group I and two in Group III, offered no evidence in this data that this shift was being made.

Punctuation. Punctuation is a feature peculiar to written language. It was predictable that Group II, the non-readers, would
make fewer responses at any level. Most of the subjects demonstrated some awareness of these literacy concepts. Only three subjects, in Group III, the older readers, responded beyond the level of simple recognition and ability to give examples. The continuity of learning evident in the study extends from intonation into punctuation. There was clear evidence that subjects had identified some aspects of their spoken language and associated it with punctuation symbols in written language. This explains why punctuation symbols such as question marks and exclamation marks, symbols related to more obvious intonation, were sooner known than periods and commas, which actually occur more frequently. This also explains why volume features so much in their examples, the "loudness" of exclamations, the distance, i.e., the "far-awayness" associated with quotation marks.

The levels of operative knowing were apparent within each aspect of punctuation, from simple recognition, through the completely imitative (putting the question mark actually made the question), to a recognition of some of the characteristics of particular sentences. For example, the possibility that a sentence beginning with is or could might be indicative of a question and the exciting quality of language indicated by using exclamation marks.

There was no indication in the analysis of the data that any subjects had yet formed true concepts of these complex aspects of literacy. There was evidence that ability to read fluently was not related to high level operative knowing of these specific concepts of literacy.
Children's Reading Behavior: Miscue Data

Data relevant to reading behavior was generated from the miscues subjects made while reading a story that was moderately difficult for them. The purpose of this part of the study was to examine the semantic, syntactic, and grapho-phonetic cues subjects used while reading and to observe (a) how these cues were integrated, (b) the particular strategies they were using, and (c) the kinds of corrections they were making. Data was analyzed from Groups I and III and comparisons were made in regard to subjects' competencies in relation to the following aspects: (1) miscues per hundred words (MPHW); (2) residual miscues per hundred words (RMPHW); (3) comprehending score; (4) corrections; (5) syntactic acceptability; (6) semantic acceptability; and (7) grapho-phonetic proximity. Data for each of these is presented in the order listed. Since two subjects did not generate a total of fifty words, all data is given in terms of per cent.

The range and means of the per cent of miscues for the first four aspects of the data are presented in Table 10.

TABLE 10

Range and Means of the Per Cent of Miscues for Groups I and III

<table>
<thead>
<tr>
<th></th>
<th>Group I</th>
<th>Group II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Range</td>
<td>Mean</td>
</tr>
<tr>
<td>MPHW</td>
<td>4.5-12.2</td>
<td>8.0</td>
</tr>
<tr>
<td>RMPHW</td>
<td>1.5-7.0</td>
<td>3.4</td>
</tr>
<tr>
<td>Comprehending Score</td>
<td>40.0-76.0</td>
<td>60.0</td>
</tr>
<tr>
<td>Correction</td>
<td>6.0-53.0</td>
<td>24.0</td>
</tr>
</tbody>
</table>
Miscues Per Hundred Words. A simple count of MPHW was made as a quantitative comparison between the two groups. Since each story was selected to provide each reader with a somewhat difficult task, the MPHW can be considered to be a partially controlled variable. In this study an attempt was made to find stories that would interest the subjects as well as being sufficiently long and difficult enough to generate miscues. No attempt was made to match complexity of language or format of selections across subjects.

Residual Miscues Per Hundred Words. Goodman (1973, p. 41) describes the RMPHW as "... what's left when the good miscues are removed." It is obtained by reducing the MPHW by the comprehending score. It represents the frequency of miscues which remain unacceptable after correction.

The table shows that there is little difference between the means of the groups in either MPHW or RMPHW, but range in both is wider in Group III than in Group I. Goodman (1973) found in his study of different levels of ability across grades two to ten, that the range of MPHW is consistently lower and narrower for higher proficiency groups.

In both groups the RMPHW is considerably less than the MPHW. This indicates that subjects are correcting significant miscues in their concern for meaning. The smaller RMPHW indicates a smaller loss in comprehension, and so gives a finer picture of reading efficiency. On this basis it is possible to identify within each group the most effective readers. The lowest RMPHW score in either
group is .6% and this is made by a subject in Group III. The second lowest score is 1.5% in Group I. Scores in both groups indicate a high proportion of efficient readers. In Group I, five subjects have RMPHW less than 3% and in Group III, four subjects have 3% or less. The means of the two groups were only .2% apart.

**Comprehending.** The comprehending analysis is a process measure designed to provide additional insight into the effectiveness of reading. It is arrived at by adding together the per cent of miscues that are semantically acceptable and the per cent that are semantically acceptable after correction. Hence, it deals only with the proportion of miscues concerned with acceptable meaning, before or after correction. It is considered a process measure because it checks on the reader's own concern for meaning, and the strategies he uses to produce structures that make sense. It provides insights into the process, insofar as the subject makes overt corrections.

The difference between the mean of the two groups on this measure was minimal; however, there was a wide range within the groups.

**Correction.** Correcting indicates that the subject has found some dissonance in what he has read and is attempting to resolve this dissonance and make sense of what he is reading.

The means of the two groups were very close and statistical treatment was deemed to be unnecessary. The range is great in both groups, greater in Group I than in Group III. The subject in Group I with the least number of corrections, 6%, has a comprehending score of only 40%, which is not indicative of proficient reading. The
subject in Group III with the least number of corrections, 10%, is the most effective reader in both groups with a comprehending score of 10%, and a low RMPHW of 0.6%.

**Syntactic and Semantic Acceptability.** Goodman's (1973) taxonomy makes fine discriminations of syntactic and semantic acceptability of miscues by classifying four situations in syntax and five in semantic acceptability. These are (1) totally unacceptable, (2) acceptable only with the prior portion of the text, (3) acceptable with the following part of the text, (4) acceptable only within the sentence (semantic acceptability), and (5) acceptable within the passage. Per cent of miscues on these aspects can be seen in Table 11.

Some differences are indicated in Table 11, Group III's mean of semantically unacceptable miscues was 10% higher than Group I; and Group I subjects made more (8%) miscues that were acceptable with the following part of the text. A similar pattern is found in the syntactic analysis. Group III subjects had a higher mean, 41%, of unacceptable miscues than Group I, 31%; Group I subjects had more miscues that were acceptable with following text.

**Grapho-phonetic Proximity.** Data pertaining to the sound and graphic proximity of miscues shows the extent to which subjects relied on graphic-phonemic information in reading. In Table 12 sound and graphic miscues are compared across the two groups. In common with other research, subjects used graphic cues to a greater extent than sound cues. Difference between the two groups in their use of phonemic cues was negligible. However, the mean per cent of miscues
TABLE II

Per Cent of Miscues in Four
Syntactic and Five Semantic Categories

<table>
<thead>
<tr>
<th>Semantic Miscues:</th>
<th>Unacceptable</th>
<th>Acceptable with Prior Part of Text</th>
<th>Acceptable with Following Part of Text</th>
<th>Acceptable within the Sentence</th>
<th>Acceptable within the Passage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I</td>
<td>31</td>
<td>19</td>
<td>13</td>
<td>3</td>
<td>34</td>
</tr>
<tr>
<td>Group III</td>
<td>41</td>
<td>17</td>
<td>5</td>
<td>2</td>
<td>35</td>
</tr>
<tr>
<td>Syntactic:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group I</td>
<td>19</td>
<td>26</td>
<td>10</td>
<td>-</td>
<td>45</td>
</tr>
<tr>
<td>Group III</td>
<td>28</td>
<td>18</td>
<td>2</td>
<td>-</td>
<td>50</td>
</tr>
</tbody>
</table>
TABLE 12

Means of Per Cent of Miscues In
Relation to Sound Graphic Similarity

<table>
<thead>
<tr>
<th></th>
<th>High Similarity</th>
<th>Some Similarity</th>
<th>No Similarity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sound:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group I</td>
<td>22.4</td>
<td>46.2</td>
<td>31</td>
</tr>
<tr>
<td>Group III</td>
<td>21.0</td>
<td>44.7</td>
<td>33</td>
</tr>
<tr>
<td><strong>Graphic:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group I</td>
<td>41.7</td>
<td>38.8</td>
<td>18.8</td>
</tr>
<tr>
<td>Group III</td>
<td>35.0</td>
<td>44.5</td>
<td>20.1</td>
</tr>
</tbody>
</table>

showing high graphic proximity was 6% higher for Group I than Group III.

Analysis of the miscue data revealed the sensitivity of subjects to the structure of language and to their expectation of meaning in reading. The quantitative analysis of the data did not reveal marked differences between the reading behaviors of the two groups. Group I was slightly superior in the numbers of miscues that were acceptable semantically and syntactically with text following the miscue.

Lack of difference between the means of the groups can be accounted for by the range of readers within each group. Reading level was only a partially controlled variable. Real differences were found, however, within the groups and across the groups. These differences are discussed next.
Variation in Individual Strategies Apparent

in Oral Reading Behavior

Data were examined also of individual readers within the groups and across the groups. The oral reading miscue analysis provided evidence of strategies individuals had developed to facilitate the integration of information from linguistic and conceptual sources.

Subjects in Group I were considered to be precocious because they were reading at a minimum of second-grade level, and they were still pre-first grade. Five subjects were in kindergarten and two boys were pre-school children. Reading level ranged from grade equivalent 2+ to 5+.

For the Reading Miscue Inventory (RMI) subjects read five different stories, but considerably more reading took place in the series of interviews throughout the study. For example, Robert (reading level 4.5) read several books without a single miscue. When asked to read at his level, he balked at the difficulty, the length, and the format of three selections offered before he read Lentil with great relish and enjoyment. Three subjects read The Magic Spring, a Japanese fairy story. The language in this story was complex and had a distinctly literary flavor, but the format was difficult for such young children. For example,

He (the old man) looked towards the sound and there in a clump of grass was a tiny baby, wrapped in the clothes his wife had been wearing.

Two girls (reading level 3+) read "How Walter Mouse Lost His Home," from Walter the Lazy Mouse. Again, the language was literary
and quite complex. The seventh subject in Group I read at grade
level two. He found reading more than a short passage tiring him.
Eventually he generated twenty-six miscues from two pieces of reading.
One was Mr. Rabbit and the Lovely Present and the other was Pickles
Raccoon Goes to the City. The former contained many alllogos, "l'll"
and "it's" and these were a particular source of difficulty. There
was undoubtedly a wide range of reading in Group I.

Group III

This group of three boys and four girls also covered a wide range
of reading ability. The most advanced reader, a black girl, read at
grade 6 level, another girl at grade 4 level, one girl and two boys
at grade 3 level, and one boy and one girl at grade 2 level. The
selection of reading material was Miranda's Cat, read by the most
advanced girl; The Magic Spring read by a girl; and Natasha's Doll,
read by a boy and a girl. One girl read chapter one from Walter the
Lazy Mouse, and the other boy read Mr. Rabbit and the Lovely Present.
It can be seen that there was considerable overlap between the Groups
I and III.

Comparison of Groups I and III

The chronological age of each of these groups was controlled.
The range over both groups was from 5.4 to 7.5. The other controlled
variable was first grade instruction. All of Group III subjects
were nearing the end of the first grade. The quantitative analysis
of the MRI showed no significant difference in their mean performance.
Yet the differences among the subjects in their reading performance
was considerable.
The two subjects with the highest comprehending scores were Scotty from Group I and Jo from Group III. Scotty was the youngest subject and Jo the oldest subject in the two groups. Their scores in percent on four parts of the RMI were

<table>
<thead>
<tr>
<th></th>
<th>Scotty</th>
<th>Jo</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPHW</td>
<td>6.2</td>
<td>2.1</td>
</tr>
<tr>
<td>RMPHW</td>
<td>1.5</td>
<td>.63</td>
</tr>
<tr>
<td>Comprehending</td>
<td>76.0</td>
<td>70.0</td>
</tr>
<tr>
<td>Corrections</td>
<td>42.0</td>
<td>10.0</td>
</tr>
</tbody>
</table>

They are both highly proficient readers but upon examination, their styles are very different. Jo reads fluently, evidently processing large amounts of material at a time. For example,

So Miranda gathered the cat (in her arms

and she and her (brothers hurried down the dark

streets in silence.

A high proportion of her miscues (58%) were semantically acceptable.

She corrected only if there was some dissonance.

and set them on the chest of drawers

To do this she regressed to the point where meaning was lost.

Scotty read with evidence of anticipation of meaning and corrected immediately when he found dissonance.

he told the

One day the old man

the old man knelt down by the spring and scooped

the water (in his hands
It appears that Scotty processes smaller amounts of text than Jo:

"She was...

But many hours passed and still she didn't come..."

and sure enough, even though...

Both Scotty and Jo are handling very complex material competently but in quite different ways. Jo is more proficient; most of her miscues are semantically acceptable and remain uncorrected. Scotty is a more meticulous reader, concerned with "correctness". He appears to process smaller amounts of material than Jo and to correct immediately he notices any kind of dissonance, with a slight tendency to over-correct. Jo seems to use the reading text more freely and to be liberated from concern for precise, accurate response.

Ricky, also in Group I, reads with many of Jo's characteristics. He makes many semantically acceptable miscues which remain uncorrected. He seems to get direct meaning from the text in the way Kolers described the proficient bilingual subjects in his study. For example,

"Trailing... and he saw no traces of her anywhere. He looked toward the sound and there in a clump of grass was a tiny baby."

His RMI shows many omissions, most of them function words, but also some adjectives, e.g., "beautiful," "little." His comprehending score is low comparatively, because in the second passage he read (he generated only thirty-seven miscues in The Magic Spring) there
were words he did not know, and some of his attempts were coded as non-words. These were words such as "cod-liver-aill," "ab-so-late-ly" (absolutely), "in-hab-bitted" (inhabited). There was evidence that he could pronounce some words while reading that were not in his speaking vocabulary.

There was evidence of subjects creating non-words because of lack of conceptual understanding. For example, Ricky and Alex in Group I, obviously were unfamiliar with "cannibals." Alex read that Pippi's father was the "king of the cannonballs" and Ricky referred to the "canal princess." Robert read about "musicians" (musicians), one of whom was a "cornetist" (cornetist) and another played the "po-colo" (piccolo). The structure of the language was maintained but meaning was lost because general conceptual understanding was not sufficient. Both readers behaved as if they expected the text to have meaning.

It seemed that Robert and Laurie "marked time" in order to process information ahead. Laurie would repeat a word several times, almost absent mindedly and then go straight ahead. Robert would make noises, "hum-hm," until he was ready to proceed. Both of these were highly proficient readers. Laurie transformed text according to her own understanding and language; e.g.,

When Walter played football he was so slow and his sisters and brothers had all gone to school by now.
She sometimes lost the sense of what she was reading and it became somewhat garbled; e.g.,

\[
\text{He cried} \quad \text{and he cried, but (it) did him no good}
\]

because there \(\text{was}\) no one \(\text{to hear him.}\)

The word "creatures" caused Laurie (Group I) to miscue. She read it first as "Christians," next as "currant," and then as "creature." She kept the syntactic structure correct by substituting words with similar grammatical function. Milly (Group III) read the same story. She made only six per cent corrections and seemed not to be conscious of any kind of dissonance; e.g.,

\[
\text{March who faster}
\]

but no matter how fast he ran

\[
\text{what became of that piece of pie}
\]

Her miscues had strong graphic proximity and lacked syntactic and semantic acceptability. Once she lost the meaning she read word for word, making no attempt to correct, anxious to get on with the reading with no concern for meaning. Somehow, she did not seem to have grasped that reading was meant to have meaning.

Mary, in Group III, had poorly developed reading strategies. She used picture cues and made little attempt to match with cues from grapho-phonemic or contextual sources. For example the text read "and then unlocked the big chest that stood in the corner." Mary read, "unlocked the big treasure" and made no correction although the text went on to enumerate items of clothing taken from the chest.
Variation in Children's Strategies in Writing

All the subjects in this study were invited to write. The Investigator asked each one to write his name and then asked, "Can you write anything by yourself?"

There were appreciable differences between the groups.

Group I. Everyone wrote his first name; only one wrote his surname. Five of the subjects chose to write, or wrote when asked, mom and dad. Five subjects made "spidery" attempts at handwriting; most had good spatial arrangements; all except two used upper case letters for all their writing.

All but one of the subjects were learning to make letter forms and were paying attention to distinctive features, e.g., "B is two lumps and P, only one." There was evidence that distinctive features within words were important too. Michaela (Micky) underlined the two A's in her name, remarking, "When my mommy writes my name, she figures out which is two A's, so I did that (underlining). She added that there were a lot of 'numbers in her name.' Stephen observed about someone else's attempt at writing, as 'bad names.'

The figural aspect of knowing how to write cat and dog and other three-letter words was apparent. They were remembered, not constructed. It was apparent, too, when Cathy and Ben were writing their surnames. They knew the letters in sequence and wrote them as they said them, occasionally returning to the beginning and repeating the sequence as far as they had gone. Ben said, "I tell myself the letters; then I spell it."
There was evidence that the notion of sound-symbol relationships was forming. Cathy constructed salad by relating the sound to the symbol, CLTD, very carefully. Roger, who wrote his first name in well-formed letters using upper and lower case correctly, could also write appl (apple) and MLK (milk). It was he who said, "Numbers are not the same as letters. You use numbers when you count and letters when you write."

Stephen wrote Hlep (help), saying, "I sound them out; you go el p!" Chris wrote easily six words relating to his family, including Jonathin and he tried to write yesterday. This was first yastoday, then yostoday. He was asked if he knew how to write yes and immediately changed the first vowel to the correct one.

Group I. The younger children in this group also had not yet got control over the manual, and sometimes the spatial, aspects of writing. All except one gave evidence of greater familiarity with written language than subjects in Group II.

Noell wrote STOP and looked at it, remarking, "I thought I'd put STUP - that would be part of STUMP." Robby wrote Pazza mistakenly for pizza, which amused him and he easily changed the vowel. Lauren asked if the investigator would like her to write "a breviation for February" and wrote Feb. She also wrote spring, remarking, "I know how to spell ring; spr is pretty hard but spring is easy." Milly indicated a similar strategy when she explained, "If I don't know a word, first I see if it's part of another word - like mother, I'd take off the M and it would be other."
Rick's attempts at writing showed an interesting mix of figural and operative knowing. He wrote apples, making several attempts, 
apls, aapl1s, aapplls, and finally appls. Again, when he wrote 
climb, his attempts were C L I B, C L I I B, C L L I B, C C L L I I B B. He knew it 
was incorrect and was exasperated with himself as he made these 
Attempts. The interpretation given here is that Rick had processed 
a great deal of information about written language; he made sound- 
symbol relations, he was aware of letter order. He also had noticed 
some peculiarities in language, e.g., the double letter, and the 
silent B, which he said he could hear. The figural aspect, or image, 
was intruding upon the structuring and ordering he was able to do.

Group III. Subjects in this older group had developed well- 
formed letters on the whole and could organize them spatially. 
Three of them used upper and lower case letters correctly. The 
other four still interspersed capital letters at times. Each sub- 
ject wrote a sentence ranging from "I like you" to a piece from a 
story. All subjects were able to attempt to spell, four with some 
accuracy, all showing some kind of systematic attempt, e.g., elfuant 
(elephant), penat buter samwich. All subjects were aware of which 
words they could spell and those that presented difficulty. For 
example, Steven said he could not spell monkey and wrote mnkey. 
Cathy had the greatest difficulty in spelling. She knew there was 
a sound-symbol relationship but was making incorrect connections, 
e.g., the grapheme r was interpreted as uh. She tried to write milk, 
first writing melk, then malk, having obvious difficulty with the vowel.
All subjects could write their first name. Alex, in Group I, a fluent reader, demonstrated the least manual and spatial control. He wrote his name in upper case letters, diagonally, in the middle of the page. Cathy, in Group II, who said her favorite occupations were "writing and script" wrote her first name in script. She wrote her surname too, but very carefully in upper case letters, saying the sequence of letters as she did so, several times returning to the beginning since she knew her surname only in this way. Ricky, in Group I, when asked to write his name, chuckled and wrote it vertically. He thought this was a great joke and stated that it was not the usual way. He wrote his surname much more laboriously in the conventional way, omitting one letter. Both were familiar enough in knowing how to write their names to be able to enjoy playing with writing them.

There was a distinct developmental pattern across these groups. The younger subjects in Groups I and II could be compared in regard to manual control and spatial organization. The non-readers, in general, were paying attention more to the figurative aspects of writing, sorting out the distinctive features. They would say, for example, "up-down-up" when writing N, whereas most of the readers seemed to find it sufficient to say the letter name. There was evidence of growth in operative structures, for example, in the attempt to construct rather than only remember the written form of words, in the attempts to make sound-symbol relations.

Group III were far superior in terms of manual control, spatial organization, and use of upper and lower case letters. The range
extended to subjects able to write complete sentences. Some subjects could demonstrate, in writing, examples relating to different types of sentences, e.g., questions. There was evidence of growth of understanding of rules in spelling, e.g., "write must have a silent w." There was evidence that two subjects in Group III were still very dependent on memorizing rather than constructing words they attempted to write. The next data give detailed descriptions of individual children's performance in the form of profiles.

Profiles of Three Subjects

In this section data demonstrating variation within groups and across groups has been presented. Profiles of subjects were assembled in order to present information and discussion relative to individual subjects. These profiles indicate the personal, idiosyncratic nature of the different approaches to literacy. They indicate the range of operative structures built up by the child. They afford some insights into the status of a particular child's present understanding of concepts concerned with literacy.

Profile of Scott (Group I) - C.A. - 5.2, M.A. - 8.4, R.L. - 5.2
Cognitive: Inclusion 6, Logical addition 5
Class: Pre-school (pre-kindergarten)

Concepts of Reading

Attitudes. Scott likes reading, particularly nature books from the library. He told, in great detail, the story James and the Giant Peach. He was reading and enjoying this book, but so far, had read "only fourteen chapters!"
Purpose and Function. It's useful to be able to read because "then you can learn things." Reading "teaches you something, tells you about nature, about animals and fish."

Process (what is involved in reading). It involves "sounding out words." Feedback is obtained from parents who confirm the child's hypothesis, or, supply more information. In Scott's words

I told you I sounded out words (when learning to read). I go m a n (phonemes) and if I don't know I ask my mom and dad and if it sounds right, they say 'OK' and if it isn't they tell me the sounds.

Concepts of Language

"Concepts of Print" Test: Score, Stanine 8.
He did not recognize quotation marks or comma.

Graphic Cues. Scott read the geometrically transformed text easily, referring to it as "upside down." He demonstrated the fact that he was perceiving words as wholes rather than piecemeal by failing to notice position errors in words in the text. When he was asked to look back at what he had read he was amused and commented that "they had words backwards." He was able to indicate the position errors and rearrange the letters correctly.

"huose - has the u right there and the o right there." (he rearranged them)

Performance in Writing

Apart from his name, Scott, which he printed in well formed, spatially oriented letters, this subject had little facility in writing. He used mainly upper case letters, with a few lower case, randomly interspersed. His writing performance consisted of ten words,
all of his own choice as words he knew he could write. All the words were correctly spelled, except like (LiK). They were all words connected personally about family and food.

He gave evidence of the distinctive features he attached to some letters, by talking as he made them, e.g.,

K - "a line, and another line up and a line down - or maybe a line and another line down in the middle of a K."

B - "line - circle - circle

R - "I make a R like a P and then I go - wham (he put in the down stroke) - looks like a falling R."

Phonology and Visual Patterns

Scott chose the most possible English words six out of eight times, as being "easier to say," He was able in some degree to be explicit about the cause of the difficulty in reading and pronouncing the impossible words, in four instances, e.g.,

tildk - is harder to say because it has a t l and k.

The word wrangle was written as a word he was not likely to know, in order to see how he would tackle it. He said, "It's wrangle."

Q.: "How did you know that?"
S.: "I watch the reading shows and my mom tells me."

Q.: "How did you know it's not wangle?"
S.: "Because there's an r squeezed in. wrangle wouldn't sound right. You'd write rangle like this (writing it)."

Q.: "But this is the real way to spell wrangle. What about w?"
The ego-centric nature of Scott's thinking was evident in his reply, "Well, he might go on vacation, or maybe he's out of town - or maybe he died! Unlike Darren, in Group III, Scott was unable to state the WR rule.

Words and Letters

Scott identified words and letters upon request quite accurately, but confused them at times when he was talking about them. He said he chose mru instead of frul "because it doesn't have more words than the other."

Q.: "What do you mean, more words?"
S.: "Well, it has the same number."
Q.: "Of words?"
S.: "Oh - letters."

He distinguished upper case and lower case letters and referred to them as "capital" and "little" but was unable to put forward any reasons for their particular use.

Punctuation

Scott wrote his full name Scott, M. T...? He identified the periods but gave no reason for their presence. He read his name with exaggerated questioning intonation. He read it again, not as a question, and said, "Now it has a period." He demonstrated further,

... period. It tells you to go like, Mother.
(said very emphatically) A question mark would be mother (with intonation as if calling from afar). No. A question mark would be, Mother?
(with questioning intonation).
As further evidence of his knowledge of the relation between punctuation and intonation, Scott made an exclamation mark and said,

"It's for saying things like ... for saying things real loud to scare somebody, like ... Boo! (very loud). I do that to my mom. I come inside. I open the door real quietly (he acts this out) and I shut the door real quietly and then I jump up and say "Boo!" and she's scared and Mom says, 'Why you scared me!'"

Scott did not know the word sentence. The investigator indicated a sentence, the last one in the story, on a page by itself and asked, "What do you call all this?" Scott replied,

"It's a kind of word - words. When I say, 'The waves splash in the hole,' (said very fast) that wouldn't be anything - just a boy splashing in the hole - without "being a part."

Scott could have been indicating that it only had meaning in relation to the rest of the story. Again, the figural aspect was important, in some way related to the speed with which he read.

Reading Strategies

Reading Level: 5.2, MPHW: 6.2

Oral miscues generated while reading. Scott began reading Pippi Moved into Villekula (Grade level 5) but he disliked the story and left chunks out. He then selected The Mask Spring (Level 4) and read the complete story.

It is apparent from Scott's miscues that he is a proficient reader who makes highly effective use of reading strategies.

He has a high Comprehension Pattern. Showing: No loss 81%: Some loss 6%: Loss 13%. Grammatical relationships show 70% strength. His use of grapho-phonemic clues is low. His profile shows 44% of
graphic and 48% of phonemic miscues as having no grapho-phononic proximity. He corrects when dissonance occurs in grammatical structure that effects the meaning of the story, e.g.,

"he'd changed so ___ that for a moment".

The format of the story was itself difficult for such a young child, as the print was small and the lines close together. However, Scott read with enjoyment and understanding. The story had a distinct literary style, e.g., "It was crystal clear, cold as ice and sweeter than new cider;" "the wood seemed like a feather on his back." Some of his miscues appear to be related to the style, e.g.,

"The bird led him far up into the mountains into ___ valley where there ___ had never ever been before."

His concern for meaning is apparent in his tendency to correct miscues in order to produce semantically acceptable sentences, e.g.,

"But many hours passed, and ___ she was didn't come."

Scott demonstrates prediction of both structure and the thought of the author in this miscue involving intonation and punctuation:

The little baby was his wife! She had drunk ___ much of the magic water.
This miscue was probably also influenced by the position of the word too at the end of the line.

Discussion

It is evident that Scott has the ability to use the reading process. He provides ample evidence that he is not operating at a level of words but is selectively using and integrating information from grapho-phonic, syntactic and semantic sources. He displays remarkable sensitivity to grammatical and semantic relationships within the text. There was evidence in the way he read the story and in the discussion after the retelling that there was a high personal response factor, i.e., the story was meaning something to him personally.

His ability to read far outstrips his ability to write, which is to be expected, and his knowledge of particular concepts of language. The figural aspect of his knowing is apparent in the way he centers on volume in relation to punctuation, an exclamation mark is associated with loudness only; a period after mother makes it sound "far away." He has pre-concepts, not true concepts apparent in the way he centers on figural aspects.

Yet, his performance in using the reading process is indicative of an underlying competence similar to the competence he displays in using oral language. There is no evidence that indicates that he acquired his ability to read in a different way from the way he acquired language.
Profile of Kevin (Group III) - C.A. - 7.3, M.A. - 8.10, R.L. - 3.8
Cognitive: Inclusion 6, Logical addition 6
Class: First Grade

Concepts of Reading

Attitudes. Kevin likes to read, and write, particularly "those books we got from the airport." He finds that they are "too hard" for him, because they are really "grown up books." He belongs to the "I can read" Club and so gets a new book monthly. His favorite ones to date are Oscar the Otter and King Max which is also the funniest one.

Purpose and Function. Reading is functional as well as enjoyable. "Like sometimes, if there's a sign to read, like 'Wet Paint, Don't go past this line.' If you couldn't read you'd get wet paint all over you."

Process (what is involved in reading.) Kevin does not remember when he learned to read. He thinks he was about 4 years old, in a school back in Boston. He would help a younger brother learn to read by first reading the book to the child and then he would give him the book "to see if they can remember all the words that I said." He does not think reading is just remembering all the words, "it's pretty hard - if you haven't seen them before - or heard them - you have to sound them out."

Kevin thinks you should know the alphabet before you learn how to read, although, when asked, he did not think being able to say your ABCs helped very much. "They should know all the sounds of the alphabet, cos if you don't, you won't be able to sound out the words
that are pretty hard." Kevin thought "sounding out words" worked most of the time, for him, although words like "were" "... would be almost impossible because it has two e's."

Concepts of Language

"Concepts of Print" Test: Score, Stanine 8.

He did not recognize quotation marks or comma.

Graphic Cues. Kevin read the geometrically transformed text with amusement. He was alert to the possibility of peculiarities in the text and looked out for them. He said that ni and eth were "unusual." They had changed them round. He could reorganize the letters into real words easily, except for wsim (swim) when he said, "the w is supposed to be at the end."

Performance in Writing

Kevin writes in well formed letters, well arranged spatially. He uses upper and lower case letters correctly. His writing performance consisted of single words and a sentence. "I like to play Monopoly," which he chose to write. He spelled correctly. He said each letter name when writing 'monopoly,' a little puzzled because he thought it should have an a somewhere. He generally remembers how to spell but sometimes has to sound them out. His very good handwriting was remarked upon and his reply was, "I've been to school for 3 or 2 years."

Phonology and Visual Patterns

Kevin choose the most possible English words seven out of eight times as being "easier to say." (mrul was the one chosen incorrectly).
He commented on words that were similar in five instances, e.g., spranc - like spring; flamp - like flip; plump ends like flamp.

Kevin was able to say explicitly in three instances what exactly made some of the words difficult to read or say.

- t lids - the l after the t, and the k make it unusual
- f wavep - there's almost no word that begins with fw
- spwejt - difficult because of the ejt

The word wrangle was written as a word he was not likely to know, in order to see how he would tackle it. He did it in this way.

w r (phonemes) and rang radiant

w rang, w ran

He then asked, "Is the w silent? w r (phonemes) hardly makes any sense."

w r angle - it's wrangle

He knew there were other silent letters - like silent s's - "but I can't pick one up right now."

Kevin knew what he could write, and what he was not very sure of.

Words and Letters

Kevin identified words and letters accurately. He used upper and lower case letters. He used the term capitalized and gave examples of when capital letters were used:

1. at the beginning of a sentence
2. Mother - if its the name of someone you always capitalize it, no matter where it is in the sentence.
3. You capitalize animals and states.
Kevin gave the difference between words and letters,

a letter just says a sound and a words says a whole something.

He pointed out examples from the text.

**Punctuation**

Kevin pointed out a period and said, "That goes at the end of a sentence - if it means something." It was difficult to discover exactly what he meant. It appeared that he recognized that all punctuation at the end of sentences had meaning. He could describe a question and give an example of using an exclamation mark, e.g.,

An exclamation point - you put it when you only have one or two words, so you go real loud.

Q.: Like what?

K.: For one word. Help! (he shouted).
   For two ... (he hesitated and thought).

Q.: Would you have an exclamation mark if you say Kevin Mc. . . (his name)?

K.: No. I'd have a period because that's a sentence.

Q.: What is a sentence?

K.: It's something where you're telling somebody something.

Q.: Like? Tell me a sentence.

K.: "I go home from school at 3:40 on the bus."

When Kevin was asked to point out a sentence in the text, he read, "Time to go home," she said." He said he knew it was a sentence because,

there's a period there (at the end) and a period there (at the end of the preceding sentence), so I knew a new one would start there.
Kevin said that he knew all about punctuation "because we've been doing punctuation for the last couple of weeks."

Reading Strategies Reading Level: 3.8, MPHWL: 6.5

Kevin talked a good deal about "sounding out" but in fact, when he tackled words he did not know, he tried out words that he knew, that had some graphic proximity, e.g., wrangle and range radiant wrangle.

Oral Miscues Generated While Reading

Kevin read The Outside Cat completely.

It is apparent from his miscues that Kevin is a proficient reader who makes effective use of reading strategies. His Comprehension Pattern shows: no loss 62%; some loss 4%; loss 34%. Grammatical relationships show 54% strength. His use of graphic cues is high, only 8% show no graphic proximity. Sound proximity is high too, but less so than graphic, 14% show no phonic proximity.

In general, Kevin worried away at words he was not sure about since he knew reading was meant to make sense. However, this was not always the case, e.g.,

(saucer)

"and sometimes a sucker of milk in the yard for him."

He made no attempt to correct sucker. He left 30% of semantically unacceptable miscues uncorrected. He seemed to be content if the word was perceptually consonant, e.g., arm and alarm (ER) anxious and anxious (ER).

On occasions he attempted to build the word and abandoned the attempt, e.g., p-- (politely). Miscues that were grammatically unacceptable show the same tendency, e.g.,
Samuel saw a shelf
On cold winter days

Kevin demonstrates a complex example of semantic change.

did get but when
Samuel dodged inside between their legs.

Here it is clear that Kevin is predicting both the structure and the meaning. He recognized when he was reading that there was dissonance but decided to carry on. He made precisely the same miscue later in the story. Kevin corrected 40% of his miscues.

In this case Kevin having recognized that there was dissonance, regressed in order to correct.

Repetition of the Story

Kevin was not anxious to retell the story. He said it was not exciting enough. He preferred Bruce's Loose Tooth. Evidently, a child losing his tooth has more meaning for Kevin than an outside cat's attempts to become an inside cat!

Discussion

It is evident that Kevin is concerned about meaning. His non-word miscues demonstrate his reliance on graphic proximity, e.g., crayled for crawled; anixos for anxious. He is a very matter-of-fact boy who seemed to have decided in this instance that even if a word did not make any sense, there was nothing he could do but make it as grapho-phonically near the real word as possible.

This boy scored highest in his group on the categories Phonology and Punctuation and highest in the population in the category
Punctuation. He understood that constraints existed in the phonology of the language, and that there were spelling patterns. His expectations were that order and organization were to be expected in language.

He revealed high level operative knowing in relation to punctuation. Evidently, the superordinate class, sentence, is outside his knowing range. He is familiar with question. His operative knowing includes being able to give examples, transpose a sentence into a question, and give examples of likely first words in the question (could, is).

Limitations in his understanding of sentence and exclamation are apparent. Both of these remain preconceptual structures, the sentence depending upon the figural confines of two periods. The exclamation is still tied to volume, and limited to one or two word examples.

There can be no doubt that this boy has developed high level operative knowing of literacy concepts and that he moves confidently within the written form of language, aware both of what he can do, and what he cannot do.

Profile of Cathy (Group II) - C.A. - 5.9, M.A. - 7.4, R.L. - No score
Cognitive: Inclusion 4, Logical addition 0
Class: Kindergarten
Concepts of Reading

Attitudes. Cathy said that writing was what she liked best to do in school because "you learn new words every day." She likes reading. She responded to the question, "What do you like to read?" with, "In a book." She said that there were lots of little books that
"We learn to read" in school and take home, "like Book 12 or Book 6." Cathy said she had brought back Book 17 today.

Cathy said she was reading, not still learning to read. She added, "We like pictures and we just don't know the words."

Purpose and Function. The purpose of reading was "well, to read books." Cathy was asked if it was useful to be able to read when you went to the store. She replied, "My mom never lets me bring books to the store." Cathy was pressed to say how she found out what she wanted in the store.

Q.: You think of it - what you want.

C.: How do you know how to find what you want in the store?

Q.: You just look for things.

C.: How do you look? Do you look for the shape of something, or words or the name on the package?


Q.: Do you know any words you look for in the Supermarket?


Process (what is involved in reading). Cathy said that when you read you have to think about words. Several questions relating to what she thinks or how she thinks, including direct questions such as, "Do you try to think if you know what it begins with? Do you ask yourself if it's like any word you know?" Cathy simply replied, "I think."

Concepts of Language

"Concepts of Print" Test: Score: Stanine 6
Graphic Cues. Cathy noticed and laughed at the geometrically transformed picture and text, saying, "It's upside down." She was not aware of position errors in the word. Her attention was drawn to saw and was together in the text. She was told the words and asked if she could tell anything about them.

C.: There's a a (letter-name) - there's two a's - there's two s's in it.

Q.: Sometimes children mix up saw and was. Do you know why?

C.: Because they rhyme.

Syntax. The page with the faulty syntax was re-read to Cathy and she was asked what she thought of it.

C.: Doesn't sound very good.

Q.: Why's that?

C.: Because that's not supposed to be there.

Q.: What?

C.: I sat in the hole.

Q.: What about this one. "I splashed my with feet."?

C.: That's supposed to be right there.

Q.: Then it would be, "I splashed my feet with."

C.: No, ...

She thought for a while and gave up the struggle.

Performance in Writing

Writing was Cathy's present favorite pasttime, especially writing her name "and script." She spoke of script all the time when she actually used cursive writing. Manuscript, in the ordinary sense, she called "just plain writing." She wrote Cathy in "script" but
was not familiar enough with her surname to do this so she used a mixture of upper and lower case letters, saying each letter name, going back to the beginning frequently to get the next one in sequence. Cathy wrote MOM. She could not make it into MOMMY or write DAD but said she could write cat and cow in script. She said that her mom taught her to write cow one morning.

In order to remember D Cathy said, "Make a straight line" and demonstrated with a reversed D. She muttered to herself about the formation of the letters as she made them.

When Cathy was complimented on her ability to write she glowed, and said, "Sometimes, I even know how to draw hearts."

**Phonology and Visual Patterns**

Cathy chose the most possible English words six out of eight times. She did not make any connections with similar words.

**Words and Letters**

Cathy identified words and letters and wrote accurately two letters, two numbers and a word. (AB 34 Cat) She first wrote Cot and then changed the vowel. When asked what the word cot was, she replied so. She was obviously aware of phoneme grapheme correspondence. For example, salad was her favorite food and she began writing the word again beginning with C (like so for cot). She was asked what else she could hear when she said salad. She wrote, slowly, listening to each sound she made, CLTD. She tried to write, I like milk and wrote I LKM LK MK.
**Punctuation**

Cathy could name question marks because "my dad told me." The question mark was there because "he's asking a question." She remarked after page 16 was read that the house was too little and that was another question. She recognized a period and said, "That means the end ... of the word." She knew that there were not periods at the end of every word.

**Reading Strategies**

Cathy had made no score on SORT. She was invited to join in reading Sand. She began reading with the investigator but contributed only words like l and a. Once the context of the story was established she predicted words like sand and hole.

**Discussion**

It is possible to discern Cathy's degree of understanding of the reading process. She has established the relationship between text and message though she is not sure of the precise function of text and picture. She can identify letters and words, name many of the letters, and even make some phoneme-grapheme relationships. The figural aspect of her knowing is apparent in her need to pay attention to the distinctive features of letters as she writes, the need to repeat the letters of her name aloud and in sequence. She very much needs the image to assist her as she is still imitating rather than knowing. She is paying attention to writing very specifically at this moment in time, particularly to the form of letters, both "script" and just "plain," ordinary writing. Her security in "knowing" three words is apparent in her writing. "Cathy" she knows and can use at
will. This is so of cat and cow which she has assimilated, but not of her surname. These three words she can now play with, so long as they remain the same. If one letter is different (cat or cot) then Cathy again goes back to her real "knowing" - that c for some reason has the phoneme ɔ as in so and salad. Although both her first and last name begin with C she showed no interest in the fact or sign of knowing this, when it was brought to her attention in the interview.

The status of her understanding of concepts related to print show greater awareness than many of Reid's subjects. But then, she shows that she has already had experience of using books.

Summary

Through a series of personal interviews data was collected relating to:

1. attitudes to reading and understanding of the purposes and functions of reading.
2. status of the understanding of concepts of written language and constraints inherent in written language.
3. strategies used in reading and early attempts at writing.
4. performance of subjects on Piagetian tasks of class inclusion and logical addition.

Qualitative data was presented from all aspects and quantitative data where it was appropriate.

Almost every subject had positive attitudes towards reading. Data showing understanding of the purposes and functions of reading indicated that, in general, younger readers' responses were personal
and imitative, while older readers indicated extended understanding of reading as enjoyable, as a source of information and a means of regulating.

Quantitative data, based on means of scores, that emanated from probing into understanding of concepts of literacy were assembled into a multivariate profile. This was scrutinized so that patterns, clusters and discrepancies would be discernable and indicate the focus of any statistical treatment. It was apparent that differences between the group means were minimal and no statistical treatment was deemed necessary.

It was clear in the multivariate profile that Group I most approximated Group III in all the variables related to reading and written language. There was a trend visible that showed Group III to be slightly in advance of Group I on the variables, phonology and punctuation. The high standard deviations on these measures indicated a wide range of differences within the groups.

The differences within the groups and across the groups were discussed qualitatively. A wide range of operative structures underpinning children's knowledge of these variables was discernable. It was possible to trace continuity in learning from linguistic to literacy concepts.

Data that emanated from children's reactions to discrepancies in the context of Sand revealed the extent to which children were sensitive to grammatical relations, and the extent to which children read words as wholes. Some children were familiar enough with written language to read upside down text.
An analysis of the miscue data resulted in showing quantitatively that there was little difference between Groups I and III when the means of various aspects were compared. A qualitative analysis gave evidence of wide variations within and across groups and the range of strategies in use by subjects, even of the same measured reading ability reading the same material.

An analysis of the samples of writing available from each subject revealed a developmental trend. This trend was apparent in manual and spatial control, use of capital and lower case letters, shift from one word efforts to sentences, shift from purely figural remembering of known words to construction of words, graduation towards some understanding of rules.

Inclusion and logical addition tasks demonstrated that children in all groups had simple inclusion, that all Group III children and some of Groups I and II also completed the logical addition task. It was apparent from the data that ability to succeed in logical addition was neither sufficient nor necessary for ability to read. It was also apparent that only subjects who could succeed in logical addition responded at the highest level on the variables phonology and punctuation.

Tentative conclusions drawn from this data and its implications for educating young children are presented in Chapter V.
CHAPTER V

Summary, Conclusions, Implications, and Recommendations

Summary of Procedures and Findings

This study set out to examine the thinking structures used by young children as they become literate. The assumptions were made that the child was a constructive learner and that since learning was an integrative process, the child must have operating a range of assimilatory schemes.

The study was conducted in three phases. In Phase I, subjects were identified and three groups of subjects were formed according to criteria set for each group. Instruments used for selection were (1) the Slosson Intelligence Test, (SIT), which established mental age, and (2) the Slosson Oral Reading Test (SORT), which established grade reading level.

In Phase 2, in a series of investigatory interviews, the status of children's concepts within written language was probed and data pertaining to their attitudes towards reading and their understanding of its purpose and function was collected. The interviewing procedures were particularly important since this study was specifically concerned with gaining insights into children's thinking as they were actually engaged in reading and writing.
This entailed detailed discussion with children, following the leads they gave, asking prepared questions and pursuing the reasons and explanations they offered.

The range of interests young children pursued was wide. These interests were apparent in, for example, an explanation of the rules of the game of marbles; an account of how tiny water creatures with "triangular heads" appear under a microscope, including comments on the importance of careful focusing; a detailed explanation of speeds at which records should be played, how one knew which speed to select and the difference made in the sound if the wrong speed was used. A girl, just six, described playing school with the nine-year-old next door who taught her "tough words like quarterback and football."

In discussion of such interests, and in the process of using specific materials, data were obtained pertaining to their attitudes towards reading, their understanding of its purpose and function, their implicit and explicit understanding of phonology, simple concepts of print and the status of their understanding of such literacy concepts, as words and letters, punctuation, capitalization and sentence.

In this phase children engaged in a variety of oral reading; specifically, "Concepts of Print Test entitled Sand" which contained a page printed upside down. There were, also, discrepancies in syntax and position errors in words, all of which afforded opportunities for observation of significant reading behavior.
Data from these sources was assembled into a multivariate profile in order to facilitate the detection of patterns, clusters, or discrepancies, that would have indicated statistical treatment for significant differences. In fact, the multivariate profile indicated trends, but no significant patterns of discrepancies to warrant further analysis.

In Phase 3, children's behavior while reading was probed by using the Goodman Reading Miscue Inventory to code the miscues children made while reading a moderately difficult story. This data was analyzed according to the Goodman Taxonomy of Reading Miscues. The means of scores on selected components of the data were examined for differences that would warrant further treatment. The findings were as summarized below:

**Attitudes.** Nineteen of the twenty one subjects had positive attitudes to reading; two of the early readers thought it was sometimes boring.

Regarding purposes and functions of reading, responses showed a shift from personal, platitudinous/imitative responses of younger subjects to a wider understanding of functional values. More of the older readers saw instrumental and informational outcomes.

**Understanding of the Reading Process.** All subjects were aware that knowing words and letters was in some way connected with the reading process. In all groups at least one subject was making generalizations about phoneme-grapheme relations and knowing rules. In all groups, too, one subject thought extraneous matters such as "being quiet" were essential to the reading process.
Data indicated that all the reading subjects and all but one of the non-readers, had at least a figurative knowledge of word and letter. A high proportion of subjects could recognize a period and question mark. Evidence of degree of operative knowing was apparent ranging from low level knowing, "If you put a question mark then it will be a question," to an explanation of how the first word of a sentence might indicate a question.

The terms letter and word were known to all subjects but there was a great deal of confusion in the way they were used. Even subjects who could identify them, who could point out examples and give their own examples, confused them when referring to them. There was no evidence that any individual subject had yet attained a full concept of any of these complex elements of literacy.

There was evidence that children could read fluently with only a limited explicit knowledge of these concepts.

Implicit awareness of the phonological/graphic constraints inherent in language was apparent in all subjects. Two of the precocious readers and two of the non-readers gave evidence of similar understanding of these constraints in written patterns. This was evidenced by responses such as; "There's hardly any words begin with spw." "They've left one out," meaning a vowel between it in sprejt; "then it would be sprejit."

Evidence of continuity in learning was discernable in the way children "played" with words, talked about words that were not real words, found words with similar consonant clusters, and ability to identify the constraints in non-English clusters.
Similarly in concepts relating to punctuation, much newer learning than phonology, subjects gave clear evidence of linking these symbols to their own intonation. Again, the growth of operative aspects was apparent from the first notion that an exclamation mark means shouting a single word, "Fire!" to one of the older readers, a girl, who said that exclamation marks were used when things in stories were exciting.

Subjects gave evidence of a variety of strategies used in reading and writing. The non-readers in Group II and two subjects in Group I recalled distinctive features as they made each letter, e.g., "B - that's a line and two bumps." All the young subjects could write words, such as mom, and dad. Most subjects in Groups I and II used upper case letters when writing and some used upper and lower case letters interchangeably. Spelling words, for most of Groups I and II involved making a sound-symbol correspondence. It was possible to discern different behaviors in writing: Cathy could write cat and cow easily; "my mom showed me one day" and she was clearly dependent on an image for recall. She tried writing "salad," her favorite food, and produced SLTD, by constructing it, letter by letter.

The uniqueness of the strategies children use even when readers of similar measured ability read the same material were apparent in the analysis of the miscue data. Differences were seen in the corrections children made, or did not make, the kinds of dissonance that caused correction, the hesitation made as they processed information, the regressions made by some children in order to pick up
the meaning again, the picture clues such as the word chest read as treasure, the degree of reliance on graphic and phonic information.

Differences among groups of readers were not apparent when mean scores of miscues reflecting grapho-phonemic proximity, comprehending, semantic and syntactic acceptability were compared. The range of differences and the standard deviations indicated that real differences existed within the groups. The greatest differences apparent in this small population were in the important areas of semantic acceptability and acceptability of miscues to the context following the miscue.

The tasks relating to inclusion and logical addition were successfully completed by thirteen of the twenty-one subjects. All the subjects in Group III, the older readers, completed both tasks, as did four of the precocious readers and two of the non-readers. Three of the precocious readers succeeded in the first task but failed the second. The evidence from this study indicates that concrete-operational structures, as evidenced by these tasks, are neither necessary nor sufficient for proficient reading.

Conclusions

It was apparent in this study that some of these young children were already highly proficient readers, processing written language with an assurance that resembled their spoken language. This was reflected in the number of semantically acceptable miscues, the transformations of surface structure into the reader's deep structure, the response of the reader to the thought of the author and to the structure of language. These readers were alert and responsive to
what they were reading. It would appear that assimilation of the reading process is complete.

There was evidence of continuity in learning, of systematic ordering of information. All these subjects, readers and non-readers had some knowledge of written language ranging from early figurative schemes to schemes supported by high level operative structures.

The overwhelming evidence is that children pay attention to context, and that the context is a rich source of cues in reading. In this study children resorted to phoneme-grapheme correspondence when they were writing, but rarely when they were reading. Their methods of tackling unknown words were to relate to known words, e.g., possess was read as poses or to identify the known morpheme, e.g., musicians was read as Music-can; and syllabication, inhabited was read as in-ha-bit-ed.

There was a marked difference between the younger subjects' reading and writing performance. Even highly proficient reading was not matched by more than the most elementary attempts at writing. All children could write their names and a few very personal words. Early attempts at writing indicated more reliance on consonants than vowels, e.g., mlk was written for milk. The young non-readers gave evidence of identifying distinctive features of letters and awareness of similarities and differences. The older readers had more manual control, better spatial awareness and more accurate use of upper and lower case letters. They indicated an awareness of correct
letter order, the phonological constraints implicit in English, and some knowledge of the existence of rules.

Implication

The value of studying young children, particularly precocious readers, was that they were uncontaminated by school instruction. It was clear that their attention was focused on meaning, of making their own sense out of the corpus of written language. The structural elements of language undoubtedly exerted a strong influence on their reading and governed their performance, but knowledge of these elements was not conscious or explicit, any more than in their use of spoken language. Consideration might well be given as to whether greater understanding and recognition on the part of educators of the quality and direction of children's own ability to learn would enable such educators to facilitate the continuity of learning that allows children to construct their own knowledge.

The range and levels of operative knowing apparent in the data clearly indicate the continuous organization and re-organization taking place as new assimilations are integrated. Explicit teaching of specific details as in much of early reading instruction, may well induce poor learning, dependent on memory, collecting information rather than integrating new knowledge. If reading is taught in this way and reading is seen by the child to have high value placed on it by people important to him, then there is a grave risk that learning itself is distorted for the child from the earliest days at school.
Essentially, the implications of this study show the power of the young child in learning and emphasize the need for educators to link in to the child's own purpose, in order to offer maximum support and guidance.

The range and intensity of children's interests revealed in this study about the real world of science and speed, for example, raise questions about the over-simplified early reading material often offered to young children. Attempts to simplify such books often results in poverty of language, in sentence patterns that are repetitious and lack linguistic authenticity or literary quality. Morris (1973), keenly aware of all that is meant by maturity in reading criticizes early material that makes maximum demand for noting exact detail and minimum demand for any kind of personal response. The implication is that enjoyment and real use of reading is more likely to follow if reading is seen to be enjoyable and have real purpose for the reader from the earliest days of learning.

The overwhelming evidence is that children pay attention to meaningful content, and that the context is a rich source of cues in reading. The implication here is that children at the early stages of reading need access to written language in contexts already familiar to them, i.e., through stories and poetry they already know, through written material made by them and with them, using their own language about things that matter to them personally. This makes it possible for them to begin to structure their own learning about the written form of language, to form assimilatory
schemes, to build up needed strategies. Teaching at this stage
is concerned with providing feedback, that is, supplying information
when it is most timely for assimilation, and with awareness of the
strategies being built up, for example, directionality and one to
one correspondence, between spoken and written words, the beginning
of sound-symbol relations.

Even the limited amount of writing produced by subjects in
this study gave evidence of a systematic way of learning. It indi­
cated the personal nature of their learning - mom, dad, other
members of the family and family pets. (It was a totally different
approach from copying from the blackboard or from prepared material.)
As children made their early attempts to construct written language
it was apparent that they sensed letter order, they made attempts
at phoneme-grapheme correspondence, there was a reliance on conso­
nants, and uncertainty about vowels. If educators could recognize
the developmental nature of this learning and link into and extend
the schemes being developed by children, the notions of rightness
and wrongness in forming letters and spelling words would be re­
placed by support and guidance being given to the learner.

**Recommendations for Further Research**

This was a searching, investigative study probing into what
children themselves thought about reading and writing, the strategies
they were developing, the range of operative knowing relating to
concepts of literacy. During the investigation and processing of
data, questions arose requiring further study.
The precocious readers in the study were reading fluently; they had no notion of how it had happened. It is time for a longitudinal study of a small number of subjects, 4 or 5 at the most, studied at the critical period of learning to read, as has been done in language acquisition studies. This would begin when subjects were 3½ to 4 years old and follow through, probably for about a year to 18 months, in order to discover exactly how they learn to read.

The precocious readers in this study were pre-school children. What happens to such children in their first year in school? A useful study would be to follow these children and study the extent to which education extends or cuts across schematic learning that has already proved its worth for the individual learner.

The precocious readers in this study made more miscues that were semantically acceptable with following text, than the older readers. Did this occur by chance or would the same results occur from a larger sample? If so, is this the result of greater use of context and is it characteristic of intuitive readers?

There was a developmental difference apparent between the subjects' performance in reading and in writing. What pattern does writing development follow? A longitudinal study of a small group of subjects learning to write, i.e., acquiring facility with the written form of language, would be likely to provide a wealth of information about the schemes and strategies used in constructing continuous language and spelling words.
The dynamic of motivation has not been considered in this study. What is it that captures the young child's attention in the first instance? Why does one child find written language in his environment (TV, signs, labels) a source of interest, while another in a seemingly similar setting does not acknowledge its existence? What kind of response makes the child pursue this interest? A further study of early motivation and response, the circumstances of learning, might shed light on this unknown area.
APPENDIX A

CONCEPTS OF PRINT TEST
### SCORING STANDARDS

<table>
<thead>
<tr>
<th>Item</th>
<th>Pass</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Front of book</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Print (not picture)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Points top left at 'I took...'</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Moves finger left to right on any line</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Moves finger from the right-hand end of a higher line to the left-hand end of the next lower line, or moves down the page</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Word by word matching</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Both concepts must be correct, but may be demonstrated on the whole text or on a line, word or letter</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Verbal explanation, or pointing to top of page, or turning the book around</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Score for beginning with 'The' and moving right to left across the lower line and then the upper line, OR, turning the book around and moving left to right in the conventional movement pattern</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Any explanation which implies that line order is altered</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Says or shows that a left page precedes a right page</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Notices at least one change of word order</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Notices at least one change in letter order</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Notices at least one change in letter order</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Says 'Question mark,' or 'A question,' or 'Asks something!'</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Says 'A stop,' or 'It tells you when you've said enough'</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Says 'A little stop,' or 'a rest,' or 'a comma,'</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Says 'That's someone talking.'</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Locates two capital and lower case pairs</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Points correctly to both was and no</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Locates one letter and two letters on request</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Locates one word and two words on request</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Locates both a first and a last letter</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Locates one capital letter</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX B

INTERVIEW PROTOCOLS
Interview protocol of Alex - Group I

C.A. - 5.6, Reading Level 4.8

Reproduction of writing produced by Alex when asked to write his name and anything else he could write.

ALEX

MOM

DAD

HAMBURGER (hamburger)

FLA (I like)
Sand

A.: Read P. 2, P. 4, P. 6

Oh he's upside down. I wonder why --
(Turned to page 8) - Now - the words are upside down. (Turned the book and read page 8).
(Read page 10).

Q.: Did you notice anything strange there?

A.: No.
(Read page 12 without noticing alterations in syntax.)
P. 13 - I sat -- nithe hole -- and I

Q.: Does that make sense? 'I sat nithe hole'?

A.: (Went on reading) ' -- I wondered.
Could a boat float here?
Could a whale -- wesim here?

Q.: Could a whale - what? Wesim?
Ever heard that word?

A.: No -- it should be swim.

Q.: What are these? (indicating question marks)

A.: Question marks.

Q.: What are they for?

A.: Something.

Q.: Could you have a question mark just anywhere? Where could you have them?

A.: At the end of words.

Q.: At the end of any words?
Could I put one here - at the end of that one 'wondered'?

A.: Yes.
(Read page 14. Read all the misspelled words as if correct).

Q.: Did you notice anything strange?

A.: No.
(Read 16 - 18 - 20)
Q.: (Turned back to page 16 and asked Alex about particular symbols)
   Alex made
   - no comment on speech marks
   - no comment on period
   - no difference between 'Home' and 'home'.
     (Very unwilling to discuss anything)
   - 6 words in sentence
     'The waves splashed in the hole'
   - 12 letters in 'On another day'.

Writing

Q.: Could you write a word? or letter?
   Write anything you like.
   (He wrote A.)

A.: Like the letter A?

Q.: Can you write a word now?

A.: With the letter A?

Q.: Any word you like.

A.: Wrote 'Alex'.

Q.: Can you write mom?

A.: Yes - (wrote MOM)

Q.: Can you write dad?

A.: Yes - (wrote DAD)

Q.: Can you write anything else?
   What do you like best to eat?

A.: Hamburger.

Q.: Can you write hamburger? Try it.
   What's the first letter, do you think?

A.: H. A -- I don't know what next.

Q.: Say the word.

A.: Hamburger -- M B A? --
   I don't know what next.
Q.: It is a hard one. Could you write I like.
A.: No.
Q.: Try it. (He wrote iL.)
Q.: Say like.
A.: Like - (said i - wrote A) K - (wrote symbol - like K).
Q.: Do you have a hard job writing a K? How do you remember? Do you say anything to remind yourself? Do you know?
A.: No.

**Attitudes and Purpose**

Q.: How did you become such a good reader?
A.: I practice a lot.
Q.: What do you practice on?
Q.: Is there any special book you like?
A.: I've got a lot of books.
Q.: Can you tell me one?
A.: *The Cat in the Hat.*
Q.: Did you say your mom taught you to read?
A.: No, I did.
Q.: Did you see anything around that you learned to read from?
A.: I tried reading books.
Q.: Who told you what to say?
A.: Nobody - I just did it myself.
Q.: Did you ask your mom anything?
A.: No
Q.: If you were going to teach your friend to read what would you do?
A.: I don't know. -- I just don't know.
Q.: Is learning to read useful?
A.: No.
Q.: No use! Why did you learn to read if it's no use?
A.: It's just boring, reading.
Q.: Why does everyone learn to read?
A.: I don't know.
Q.: Do your Mom and Dad like to read?
A.: They read books to my brother - but not me.

Logical Addition

She has more dogs.
She has lots of pets. I just think she has a lot of pets - 14 from the pet store.
Interview protocol of Chris - Group II

C.A. - 6.0, Reading Level - 0.6

Reproduction of writing produced by Chris when asked to write her name and anything else she could write.

KELLY
ERIC
DAD
LOONAT
HIN
YESTODAY
C.: Y (makes sound - writes Y).
Q.: What's coming next then?
C.: (writes YASTODAY).
Q.: That's pretty good Chris. Read it to yourself. What do you think about it?
C.: (Laughs) it says yesterday.
Q.: Can you make it yesterday?
C.: Do you put 0 there?
Q.: Try it. What would it be then?
C.: Yosterday - (laughs)
Q.: How would you put yes if you were writing yes?
C.: (laughs) erases A and writes E.
Q.: That's it!

Inclusion - Yes
Logical Addition - No

Q.: My friend has 4 dogs and 2 cats as her pets. Has she more dogs or more cats?
C.: More dogs.
Q.: Has she more dogs or more pets?
C.: More dogs.
Q.: Do you like reading?
C.: Yes.
Q.: What?
C.: Those little books.
Q.: Can you tell me the name of one of them?
C.: I see Sam.
Q.: What does Sam do in that story?
C.: He falls in a mousehole.
Q.: Is he a mouse?
C.: No.
Q.: How does he come to be falling in a mousehole if he's not a mouse?
C.: (laughing) He's a lion.
Q.: He must be a very small lion - or is it a very big mousehole?
C.: Yes. The lion said, 'Ch' -- and he had an idea and the lion had a shovel and the mouse was the other end and they come up and the mouse brought the shovel up.
Q.: Do you read any books at home Chris?
C.: Well - I can read The Snow Baby.
Q.: Is that one of your favorite books?
Q.: Do you go to the library very often Chris?
C.: Yes, I go with my mom.
Q.: Why do you think everyone learns to read?
C.: I don't know.
Q.: What's the use of reading? Is it any use learning to read?
C.: So your mom won't have to read to you.
Q.: You like books don't you? What are books for?
C.: To look at and read. They'll be fun to look at.
Q.: Are books any use for telling you things?
C.: Yes.
Q.: Like what? -- What about fishing? Are there any books that tell you about fishing?
C.: Yes - in our library there is.
Sand

Q.: Do you know what it's called?

C.: Sand

Q.: Can you open it ready to read?
   (I tell him about spade and shovel.)

C.: (Read page 2 and 4 with investigator. -
evidence of knowledge of direction - one-to-one correspondence.
Turned to upside down picture and laughed - turned to page 6
and laughed at upside down text).

Q.: Why are you laughing?

C.: That's upside down and that's upside down.
   (Read page 6 - turned page 8 the correct way and read with
investigator's great help.
Page 10 - no comment).

C.: (Page 12) I sat in the hole and I splashed my -- (pause)
   with feet (tentatively)

Q.: Why did you stop? - What were you thinking?

C.: That hard word. (with?)
   (re-read page 12).
   I sat the in hole (this time noticing the change in syntax)
   (laughed)

Q.: What do you think of that?

C.: Supposed to say - 'I sat in the hole.'

Q.: How did you know it was wrong?

C.: (Pause) --

Q.: What about this bit. 'And I splashed my with feet.'

C.: (laughed and repeated) 'splashed my with feet'

Q.: What would you say? - And I splashed --?

C.: In my hole.
   (read page 13)
   I sat in the hole (no comment on scrambled words).
   (Continued to read with much help from investigator.)
Q.: What about this word? *(wsim)*
(Chris laughs).

C.: They've put a w there?

Q.: What should it be?

C.: Leave the w away.

Q.: Then it would be *sim*. Would that be right?

C.: *(Pause)* *swim*. I don't know.

Q.: *(Asks about hear and here)*

C.: *(No response)*

Q.: What about these things here?
*(Points to question marks)*

C.: Exclamation marks. That's a period.
*(Together read page 13. Chris read *I for a* (house) and *my* (me) anticipating a house for my --)*
*(Read page 16 together)*
Investigator read page 18

C.: The sand went over - in it.
*(Read last page together)*

Q.: How many words on that page?

C.: 6

Q.: Which is the longest word?

C.: *Splashed*.

Q.: How do you know?

C.: It has more letters.

Q.: Are letters the same as words?

C.: No.

Q.: *(Turned back to page - to point out was and saw.)*

C.: *(Read)* All I saw as

Q.: Is that *as*?

C.: *Is*
Q.: Is that is?
C.: (Chris disturbed by interruption).
Q.: (Pointed out Home and home)
C.: They're the same - home.
Q.: Is there any special time when you'd put this H or that h?
C.: I don't know.

Writing
(Wrote Chris and 6 MUM KELLY ERic DAD)
Q.: How do you know how to write all those words?
C.: There's only one more. Jonathan.
C.: I don't know how to write it.
It's our baby.
Q.: Try it.
C.: (He wrote JA) Is it O or A next?
Q.: Is there any way of telling if it's O or A?
C.: I think it's A.
Q.: Try it. Say it again.
C.: Jonathan.
Q.: What can you hear?
C.: It's a O (rubbed out A).
Q.: How could you tell? What made you change your mind?
C.: (Pause) (Wrote JONA --)
Q.: Where are you up to?
C.: Jona -- what's next?
Q.: How do you write th?
C.: I don't know. -- th?
(Wrote TH -- finished iN - So now J (back to front) ONATHiN)

Q.: Well done! That's a hard word to spell isn't it? - I bet you could write yesterday - could you?
Try writing yesterday.
How do you know how to begin?
APPENDIX C

A CODED TYPESCRIPT OF ONE STORY USED
IN THE READING MISCUE INVENTORY
The Magic Spring

Once there was an old man and his old wife who lived on a farm in the country. They were both very, very old and were beginning to stoop with years and hard work. One day the old man went into the mountains to cut some firewood. While he was cutting the wood, he saw the most beautiful bird he'd ever seen in his life. "How my old lady would like to see such a beautiful, strange bird," he said to himself. So he dropped his ax and went running after the bird, trying to catch it. The bird led him far up into the mountains, into a little valley where no one had ever been before. He was panting very hard and getting very thirsty. Suddenly he saw a beautiful spring of cold water bubbling up out of the ground.

And the old man knelt down by the spring and scooped the water up in his hands. When he drank it, it was the most delicious water he'd ever tasted. It was crystal clear, cold as ice, and sweeter than new

1 (Japan) Retold by Hayaski Yoshio
"Oh, that's wonderful!" he said, and suddenly he became very sleepy. So he lay back on the grass under the warm sunshine and went sound asleep. When he woke up, the sun was getting low. "My, I must have slept a long time," he said. "The old lady will be worried about me." So he jumped up and started home in a hurry. On the way he gathered the firewood he'd cut and put it on his back. It was a very heavy load, but somehow he felt very strong and the wood seemed like a feather on his back. He didn't even stoop as he carried it, but walked very straight. "Why, I feel just like a young man again," he said to himself.

And sure enough, even though he didn't know it yet, he had become indeed a young man again. All the wrinkles were gone from his face and his muscles had become firm and strong. He walked along faster than he'd walked in many years and reached home very quickly.

The old woman was out at the gate looking up and down the road for her husband. "Hello, old lady, I'm back," he said to her.
But he'd changed so that for a minute she didn't even know him.

"Who are you, young man?" she said. "Why, I'm your old husband, of course," he said. She looked very closely at him and saw that he was wearing the same clothes as before and that his face looked just the way it had when she first married him many years before.

"But you've changed!" she said. "What do you mean?" he asked.

So she ran and got a mirror and showed him his face. He was very surprised and also very pleased. He said,
BIBLIOGRAPHY


Biemiller, A. The development of the use of graphic and contextual information as children learn to read. Reading Research Quarterly, 1970, 6 (1), 75-96.

Biemiller, A. Reading readiness: A major research problem. Paper presented as part of a program on Research in Reading: The Next Ten Years at the International Reading Association's Convention in New Orleans, La., May 3, 1974.


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Kolers, P.A. Reading is only incidentally visual. In K.S. Goodman & J.T. Fleming (Eds.), Psycholinguistics and the Teaching of Reading. Newark, Del.: International Reading Association, 1969, pp. 8-16.


