CHAPTER- I
I. INTRODUCTION AND REVIEW OF LITERATURE

Since the early 1960s, reading and writing have been the objects of intensive psychological research. In a sense, reading is a lot like driving a car, one that is readily acquired by anyone who is willing to work hard at learning it. In driving, a novice must acquire a complex of mostly novel skills. On the other hand reading involves the insertion of a new skill, visual word recognition into a cluster of existing higher-level comprehension skills. It seems quite reasonable that a nondriver would need to learn every aspect of driving, but some believe that a non-reader needs only to learn to recognise words, after which he will, in some sense be able to read. Researchers view this process as starting from decoding letters, words, etc and then moving to the comprehension of sentences and passages. In recent years, cognitive psychologists are very much interested in understanding the nature and organisation of psychological processes which play crucial role in reading acquisition.

Reading is first of all a language-related process and various researchers have emphasised the role of metalinguistic ability in reading acquisition. Tunmer and Bowey (1984) were among the pioneering researchers to emphasise the importance of metalinguistic ability in reading. The term metalinguistic refers to what the learner knows about his/her own language behaviour. These abilities develop as automatic consequences of children's developing comprehension and production abilities. Awareness of structural (i.e. phonological, lexical and grammatical) and functional (pragmatic) properties of language are interrelated.
and are essential in reading acquisition. There are considerable evidences suggesting that the major developmental changes occur during middle childhood in children's abilities to deal with a variety of tasks. Research shows children's ability to judge ambiguous sentences increases considerably during middle childhood and even beyond (Kessel, 1970; Shultz & Pilon, 1973). Studies also suggest that children's ability to understand and interpret verbal jokes and riddles develop during the same period (Fowles & Glanz, 1977; Hirsch-Paseket-Glietmans & Glietman, 1978). Another metalinguistic domain involving understanding of metaphor and simile occur during middle childhood (see, Billow, 1975; Cometa & Eson, 1978). However, the nature of relationship of metalinguistic ability to different aspects of cognitive development is not clear. But the common denominator underlying all the various metalinguistic abilities is that they involve aspects of language awareness.

Besides, the general intellectual and cognitive processes involved in reading also depend to a great extent on the ability to process verbal information. The search for the underlying nature and causes of specific reading disability has proceeded for almost a century. Vellutino (1978), reviewing the psychological factors in specific reading disability, concluded that verbal processing skills are associated with reading difficulty. Disabled readers comprise one small group of poor readers at the lower end of the distribution of reading skill having average or above average intelligence (Owen, Adams, Forrest, Stolz & Fisher, 1971; Rutter & Yule, 1975). Number of studies suggest that dyslexia is causally related to deficiency
in verbal rather than visual processing. An analysis of the different cognitive functions involved in reading reveals the importance of linguistic abilities. Experiments of Soto and Soto (1983) reported five types of categorical information contained in printed words, they are, graphical (visual features), orthographical (internal structure), phonologic (sound components), semantic (meaning) and syntactic (part of speech). Acquisition of all these skills are essential for proper verbal functioning (ability to associate the visual aspects of letters and words with their linguistic counterparts) and subsequent transformation of information and interpretation (Soto & Soto, 1983). Besides these, several other factors, like instructional methods, roles of perceptual skills, adverse environmental factors, emotional instability, minimal brain dysfunction seem to affect reading. On the whole, metalinguistic and verbal processing skills seem to affect reading process, but none of the studies so far has compared the relative strength of metalinguistic and verbal processing measures in predicting reading success. The present investigation tries to relate reading development with development of metalinguistic and verbal processing ability. A comparison of poor and good readers was also made with respect to various reading, metalinguistic and verbal processing measures.

The following sections are intended to provide a review of literature in the field of reading as related to metalinguistic and verbal processing skills to find out how much do we know of the relationship between these processes and skills to warrant some definite conclusions.
Reading Process and Development

Reading involves a complex of facilitating arts and skills, closely interwoven with speech and writing. For literate man, reading is the principal further means of acquiring not merely information and concepts, but also attitudes, insights, understanding values required to comprehend human life and human cultures. Thus it is a powerful means to maturity and acculturation and is dependent on cultural transmission for its continued existence.

Reading is essentially a form of communication. As Downing has rightly pointed out reading involves, "interpretation of signs, arbitrary symbols, deliberately created and used for the purpose of communication" (Downing, 1984). According to Downing (1984) the skill of reading is always associated with intense training and practice.

Reading is a language-related process of deriving meaning from the printed page which needs some form of explicit instruction. To Reed (1970), "reading is the identification of linguistic forms from strings of written configuration that represent them" (PP 222-223). Reading is a literacy skill usually acquired in schools. It is reasonable to assume that such a multidimensional skill is affected by linguistic, perceptual, cognitive and motivational components. A skilled reader requires mastery of the coding system of the particular script and then subsequent interpretation of the script. Thus, reading involves decoding of written symbols at the lower level and then an analysis for extraction of meaning, that is comprehension. These two measures of reading are closely related. Decoding or oral reading is
essential for meaning extraction, but it does not mean that good oral reading will lead to good comprehension (e.g. hyperlexia). But to be good in comprehension, one has to be good in oral reading. In the opinion of Stauffer (1970) reading is an active cognitive process of "seeking relationship to, differentiating form and reconciling with existing ideas. The efficient reader reads with a purpose, abstracts information, tests its value, and then accepts or rejects his hypothesis."

Goodman(1970) viewed reading as a more creative process in which the reader first scans print, selects some cues on the basis of past experience and then stores information on a short term basis. Various definitions of reading view reading as involving comprehension of written script and processing to get the meaning from it. According to Graesser(1981), the process of reading involves six domains of knowledge, linguistic, rhetorical, causal, inferential, spatial and knowledge of personality/roles. Proper organisation and schemes help in adequate organisation and interpretation of the written script. Anderson (1977) tried to explain comprehension skill with the help of a schema theory based on the works of Piaget and Bartlett. "A schema consists of a well organised semantic network of variable slots which must be filled with values within variable constraints" (Leong, 1982, P.10). Readers need enough of experience to develop appropriate schema in order to extract meaning from the text contents.

Oral reading measures are used for evaluating and diagnosing reading skills. Measurement of comprehension raise some
difficulties. Controversy arises with regard to pure reading comprehension, inferential comprehension and memory factors. To be clear, it is necessary to analyse the research tradition on reading acquisition.

**Major research findings and Tradition in Reading.**

Reading has always occupied a central place within the branch of cognitive psychology. The cognitive psychologists are interested in understanding the nature and organisation of different psychological processes involved in reading and writing. Early research in the field dates back to the work of Cattel (1885) on letter and word perception. Reading was considered to be an active cognitive process involving much more than the simple identification and combination of words. In 1896, Pringle Morgan in his classic book on dyslexia put forward the visual theory of reading disability. Huey (1908) discussed imagery aspect of reading and Buswell (1920) investigated on eye-voice span. Later Orton (1925, cited in Vellutino, 1977) developed perceptual deficit hypothesis which states reading disability is the result of some neurological deficiency which in turn creates visual-spatial confusion. Till 1960s, this served as a dominant theory in explaining reading. During the late 60s, the old view of reading gave way to a new outlook with the development in the area of psycholinguistics. Three articles by Miller (1956, 1965, 1973) were significant in forging new developments in psychology that had impact on research in reading comprehension. Miller put forth seven ideas that had implications for research: (cited in Hall, 1989)

1. Not all physical features of speech are significant for
vocal communication, and not all significant features of speech have a physical representation.

2. The meaning of an utterance is different from its reference.

3. The meaning of an utterance is not the sum of the words they comprise.

4. The syntactic structure of a sentence governs the meanings of the words in that sentence.

5. The number of sentences or meanings that can be expressed are unlimited.

6. A description of language must be kept distinct from the description of the language user.

7. There is a large biological component to the human capacity for articulate speech.

Two other developments helped the current perspective on reading process. Bruner (1957) proposed the idea of going beyond the information given in processing information. Bruner's ideas are having a profound impact on the understanding of the reading process. Various information processing models such as Logogen model (Morton, 1979, 1980, 1981; Morton & Patterson, 1980), Schema theory (Anderson, 1977), Story grammar (Kintsch & VanDijk, 1978; Johnson, 1977) at text level, mental lexicon (Triesman, 1960), etc have evolved into the current tradition in reading.

Recently, interest has shifted into the manner in which the individual processes information. Skilled reading and acquired dyslexia are best explained in terms of information processing theory. According to the skilled reading models, reading is best explained through combined activity of several components. These components are the visual analysis system, the auditory word recognition system, the processes of phonemic assembly, etc, which may be termed as "modules" (Ellis, 1985). According to Marr (1976) and Allport (1980) all of our cognitive abilities should
be explained in terms of such modules. The current information processing model views that a skilled reader uses two routes from print to lexicon - a direct visual route and an indirect phonic route. The reader takes help of direct route while reading familiar words and uses the indirect route for unfamiliar words and nonwords. Both the routes are automatic (Coltheart, 1980, 1981, 1982; Doctor & Coltheart, 1980).

Chomsky(1959) put forth new developments in linguistics emphasising on the structural aspects of language. He argued that human beings are both comprehenders and producers of novel sentences and direct experience with a sentence is not a significant factor in the way language is understood. Recent research in semantics, discourse processes and language development has affected the course of research on reading comprehension (Hall, White & Guthrie, 1986). Some of the important models describing the process involved in reading are highlighted in the following section.

**Bottom-up view of reading process.** The bottom-up view generally argues that visual information is initially sampled from the printed page and the information gets transformed through a series of stages with little influence from general world knowledge, contextual information or higher order processing strategies. Models proposed by Massaro (1975), LaBerge and Samuels (1974) and Mackworth (1972) come under the bottom-up models of reading process.

La Berge and Samuels (1974) propounded an associationist model of reading which emphasised on the automatic processes between
the visual input and understanding the meaning. They viewed that the known visual letter features help in the recognition of individual letter which in turn help to know the spelling patterns and subsequent meaning of the word. Thus, according to this model, the reader attends to one cognitive process at a time. Neither the model of LaBerge and Samuels (1974) nor the Massaro model and Mackworth model could attract much attention. The most comprehensive bottom-up model of reading was proposed by Gough (1972).

According to Gough (1972), in the first stage the visual information enters the iconic memory where it remains until the reader makes another fixation. This information helps in the recognition process which operates serially letter by letter. During the course of this process, the letter in the center of vision are placed in the character register wherein it is operated by a mechanism (the Decoder) into string of systematic phonemes. The phonemic decoder then translates these recognised letter strings into a speech based code known as words and they are held in Primary memory until the sentence can be placed in a more permanent storage. The comprehension device (Merlin) makes use of syntactic and semantic rules in understanding the sentence.

The model has some weaknesses. First, there is no provision for dealing with letters that are processed on more than one fixation. Second, the model says little about how eye movements are controlled in reading. Third, the model does not really deal with how higher-order comprehension processes takes place. Finally, the model has been criticised for the lack of
flexibility attributed to the reader. Despite these difficulties, Gough deserves a great deal of credit for stimulating a lot of research on reading. In sum, the bottom-up view expresses that the flow of information is unidirectional that is, from lower to the higher stages.

**Top-down view of reading process.** The primary characteristics of top-down model is that the "top" of the information-processing system, the part that is constructing the meaning of the passage, controls the information flow at all levels. All lower order functions are influenced by higher order ones and reading is an "externally guided thinking" (Neisser, 1967). The skilled reader is an active processor, he generally engages in a cycle which involves the generation of an initial hypothesis by minimally sampling the visual information and then generating new hypothesis about the next material to be encountered. One difficulty is that the proponents have never been clear about the kinds of hypothesis being entertained.

The best-known top-down models of the reading process are those proposed by Goodman (1970) and Smith (1971). The model was initially developed to account for the beginning readers, but latter it was considered a model of skilled reading as well. Goodman concedes that though the beginning and more skilled readers differ but the reading process is basically the same for both, involving a "selective, tentative anticipatory process". First of all the reader needs to have basic knowledge of the vocabulary in order to comprehend the text. The reader derives meaning directly from the visual input in the text by using
orthographic, syntactic and semantic constraints through top-down flow of information. If the reader is successful in guessing the word, the resulting choice is held in medium-term memory and if not, the reader looks back to the earlier text. Once the reader is able to make a choice, it is tested against prior context or grammatical and syntactic acceptability. If it fits, its meaning is assimilated with prior meaning from the text and the results are stored in long term memory. At this point, a hypothesis about the forthcoming text is made and the cycle is repeated. Thus, the model describes reading as a process involving analysis-by-synthesis (Neisser, 1967), a constructive process and a psycholinguistic guessing game (Goodman, 1967), and a process involving sampling from the printed page (Smith, 1971).

The major problem of the model is that it neither specify how the various nonvisual sources of information are drawn upon nor it says how the system deals with graphic cues that are repeated in successive fixations. Despite the overall lack of precision, the model clearly describes reading as predictive process.

Interactive view of Reading Process. Interactive models have a great deal of currency in cognitive psychology. The most frequently cited examples of interactive models of reading is that of Rumelhart (1977). The model views reading in terms of a system of highly interactive, parallel processing which is bidirectional in nature. The reader utilises seven knowledge sources namely, visual, featural, letter, letter cluster, lexical, syntactic and semantic information. These various knowledge sources interact through a mechanism called "message
The message centre interprets the text by generating hypotheses based on the content of each knowledge source. The reader uses information from both graphic and contextual sources and draws upon both top-down and bottom-up information before eventually settling upon an interpretation of the text. The model does give a reasonable account of how context and the reader's expectations can influence the reading process, it says nothing about the basis on which various kinds of hypotheses are generated nor does it specify the relative importance of the contribution of the various knowledge sources (syntactic, semantic, orthographic and lexical). The more recent model of McClelland (1986) include a mechanism to partially account for eye movements and how information is integrated across fixations, but it is still not a comprehensive model of reading process.

A recent model of reading process was put forward by Rayner and Pomatsek (1989). The model is primarily a bottom-up model with the top-down processes interacting with it. The model tries to determine the aspects of reading where understanding is better and those aspects of reading process where understanding is weak. According to the model initial encoding process can be thought of as two separate processes occurring in parallel, foveal word processing and parafoveal processing. The former process is concerned with processing the letters (in parallel) in the word whereas the latter extracts visual information to the right of fixation. Rapid lexical access takes place if it is aided by a parafoveal processing. Lexical access can proceed through either by a direct route from the print or an indirect route involving
the application of rules. This activates an acoustic representation known as inner speech which holds the information temporarily for comprehension processes. When the lexical access is completed, attention then shifts to the next word. Readers experiencing difficulty in comprehending can either consult the inner speech representation or simply look back in the text. An individual reader will differ from text to text depending on his or her knowledge of the text. So far as basic mechanism of reading is concerned, the evidence shows that by fifth grade children can read just about like adults but they differ in terms of amount of knowledge and comprehension strategies. It appears that the process of lexical access develops over time. This involves more careful visual analysis of the stimulus as well as phonological awareness. Development of this route is dependent on the developing reading skill.

From the analysis of various reading models, it appears very difficult to find out a single most convincing model. It may be due to the differences in the reading processes and goals to be served by the readers. Skilled reading involves complex cognitive process and is the result of interaction of all these processes at several levels. Therefore, the interactive models of reading appear to involve, to some extent, the processes involved in skilled reading. Structural models of skilled reading failed to explain the various strategies mastered by the skilled reader (Frith, 1985 P.303). Recently cognitive psychologists have emphasised the developmental aspects of reading acquisition which will be examined next.
Development of Reading

Reading is a product of cultural evolution and thus is dependent on cultural transmission for its existence. Young children learn to read when they are about five years old. By this time they have acquired sufficient speech competence. Young readers, though possess many of the information processing components essential for reading and writing, but they lack those processes specific to reading and writing. Reading definitely involves complex workings of the mind and learning to read constitutes an intellectual advance. Perhaps for this, the cognitive psychologists have tried to know the processes underlying letter identification, visual word recognition, grapheme-phoneme conversion, grapheme word production, phoneme-grapheme-conversion, letter execution, etc and the acquisition of such processes. During the 1960s, researchers claimed the importance of "reading readiness" to be a major factor for children to read successfully. Coltheart (1979) reviewed several studies which showed teaching children to read at a very early age has few long term benefits and the late starters soon catch up with the early achievers. The age at which children receive their first formal reading instruction varies from country to country. There is also evidence that children who start reading with good linguistic awareness do better than those less conscious of their language (Bradley & Bryant, 1983). Recent theories of reading suggest its development through various sequence of stages. Frith(1985) rightly suggested "Just as it was necessary to make explicit certain theoretical assumption about the nature of skilled reading in order to advance in the
empirical study of acquired dyslexia, so it may well be necessary to make explicit assumptions about the nature of reading development in order to advance our understanding of developmental dislexia." In the next section some developmental models of reading acquisition will be described.

**Learning to Read**

Fitt (1962) in his review of research on skill learning described about three phases in the development of any skill. They are 'cognitive', 'mastering' and 'automaticity' phases. In the cognitive phase, the learner tries to know the situation and what is to be done in that situation. In the second phase, learner tries to perfect the skill and thus master the task. Finally, once the learner has mastered the skill, overlearning is required to become an expert in the skill. This is the automaticity phase. Thus, according to this model, cognitive clarity is one of the most important characteristic of the successful reader (Vernon, 1957).

Marsh, Friedman, Welch and Desberg (1981), Frith (1985) and Harris and Coltheart (1986) have suggested three different developmental models. All these models explain the literacy acquisition in an alphabetic script like English. The three models give sequence of steps involved in reading, but they only differ in details regarding the stages.

**Model by Marsh and his colleagues.** The theory of reading development proposed by Marsh et al., (1981) is credited for being first of its kind. The stages postulated by the model are given below.
Stage one. The first stage is that of linguistic guessing. In this stage the children read a text by using linguistic context without regard to graphic features and also resort to rote learning. Unfamiliar words are read by guessing from the available context and the child lacks proper grapheme-phoneme correspondence.

Stage two. The second stage is of discrimination net guessing. At this stage child uses strategies of rote learning, guessing based on visual similarity and on visual and linguistic cues. Child now tries to identify unfamiliar words with the help of visual similarity, semantic and syntactic cues. The child operates according to the discrimination net mechanism in which graphemic cues are processed to discriminate one printed word from another.

Stage three. In the third stage i.e. sequential decoding child uses the strategies of rote learning and decodes from left to right. Environmental factor like increase in the number of printed items and cognitive factor enable the child to attend to a word's sound as well as its meaning and can process a series of letters.

Stage four. The last and fourth stage is that of hierarchical decoding. The child at this stage uses strategies of rote learning, decoding using higher order rules and analogies. The word patterns require a hierarchical rule system. The child usually enters this stage towards the middle years of childhood, around the age of 9 years.

The theory of literacy acquisition developed by Marsch, Friedman, Welch and Desberg (1981) faced some problems. The first
assumption that the increase in the child's vocabulary is essential for sequential decoding was challenged by Davies and Williams (1974). They suggested that the development of phonic skills leads to vocabulary increase. The second problem on the model by Marsh et al., (1981) comes largely from the fact that observational studies were based on children in their first year in school. Weber (1970) and Biemiller (1970) suggested that though first letter cues are very important during first year of reading, other graphemic information cannot be excluded.

Another problem for Marsh et al's theory is its lack of compatibility with models of skilled adult reading in which the skilled reader relies largely on a direct route from print to meaning. At one time he explains that "rote learning" strategy is the important strategy used throughout the stages of development, on the other hand according to him skilled reader instead of this relies on a direct route from print to meaning. But he does not give any reason for this type of deviation found in case of skilled readers. The model could not successfully explain the strategies involved in skilled reading.

Similar to the model by Marsh and his colleagues (1981) another model of literacy acquisition was developed by Harris and Coltheart (1986) which will be briefly discussed.

Harris and Coltheart's Model (1986). According to this model, child learns in a sequential order through four stages.

Stage one. Sight vocabulary phase: Understanding of the sequence of letters are important for the child in recognising words. At this stage, the child acquires reading either by whole
word method or achieve spontaneously.

Stage two. Discrimination net phase: During this phase, the child is not able to read new words, but takes some features of words as the main basis of its identification. The overall word shape is important to the child.

Stage three. Phonological recoding phase: The child reads by phonemic procedure i.e. by applying grapheme-phoneme correspondence rules. He follows for this an indirect route of converting spelling to sounds.

Stage four. Orthographic phase: In this stage the child reads words directly by visual route. In other words, he reads spelling in terms of spelling and not in terms of its sounds and as a result is able to read irregular words.

The models proposed by Marsh et al, (1981) and Haris and Coltheart, (1986) view reading development in a sequence of stages. The first two stages are the sight vocabulary stage. Thus, according to these models reading acquisition process consists of three basic stages corresponding to three basic skills of literacy acquisition that is, logographic skills (recognition of words on the basis of graphic features), alphabetic skills (use of grapheme-phoneme correspondence rules) and orthographic skills (instant analysis of words without phonological conversion). Frith's (1985) model of literacy acquisition describes reading acquisition as a steady, gradual development in a sequence of steps corresponding to Logographic, Alphabetic and Orthographic strategies. The model also takes into account both reading and writing in explaining the process of literacy acquisition. By far Frith's model (1985) appears to be
most important and promising and needs detailed description.

**Frith's model.** Frith's (1985) stage model of literacy acquisition is widely accepted. She proposed a three phase theory of reading acquisition. To quote Frith(1985),"--- there is a developmental sequence of steps, with new strategies introduced at different points in the sequence. At the same time connections are established between earlier and later phases of acquisition. Clearly, the 'outcome' of the developmental sequence is the skilled reader". (P.305). In this model, Frith differentiates between developmental lag and deviance.

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<td>3b</td>
<td>Orthographic2</td>
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(From Frith, 1985)

The sequence of three stages of Frith are shown in the above model.

The first phase involves a logographic strategy in which the child instantly recognises the familiar words on the basis of salient graphic features. According to Frith this stage includes the same processes as Marsh et al's rote learning strategy but differs in the way that the child ignores the letter order and phonology is retrieved only after identification of word.

The second stage is that of the alphabetic strategy. The
child understands the use of grapheme-phoneme correspondence rules in reading. This helps in understanding the letter order and sequential decoding of words. The child is also able to pronounce some of the unfamiliar words. Marsh et al's sequential decoding strategy specifies on the ability to correctly translate regular cue words with short vowels (e.g., cat, men). In contrast to this, Frith speaks of letter-sound correspondence.

Frith's third stage is that of the orthographic strategy. In this stage the words are instantly analysed into orthographic units without phonological conversions. It is first employed in reading and later adopted for writing.

The order of the stages are almost fixed. In order to enter the orthographic phase the child has to pass through alphabetic and logographic phase. During these processes the child enters into a nonphonological phase. Doctor and Coltheart (1980) also provide evidence regarding the use of these strategies and the various steps involved in the process of reading acquisition. Each new strategy is the result of the earlier ones. "....breakthrough to the next phase of development would occur if there is a merging of the old and new strategy". (Frith, 1985, P.311).

Arrest in any of these stages result in developmental disorder. Two developmental disorders are reported to take place: (a) Failure to acquire normally the alphabetic strategy gives way to classic dyslexia and (b) failure to acquire normally the orthographic strategy results in classic dysgraphia (Frith, 1985). Frith further suggests that after the point of arrest the child might develop some compensatory strategies either
spontaneously or it may be incorporated by the teacher.

The model proposed by Frith has some definite advantages. The model presents a sequence of holistic (logographic), analytic (alphabetic) and synthetic (orthographic) stages through which the child acquires reading. The model also differentiates between developmental dyslexia (failure to acquire a new strategy when all previously acquired strategies remain intact) and acquired dyslexia (in which case a loss of strategy may occur regardless of the order of acquisition). The model further has the scope of dealing with various types of developmental dyslexia that may arise at different stages in acquisition.

On the one hand Frith insists the orthographic phase to be non-phonological, on the other hand she says that the child has to pass the alphabetic phase which involves phonological decoding in order to come to the non-phonological phase. She also does not clearly differentiate the orthographic phase from that of logographic phase and its relationship to intermediate phonological decoding. In spite of some demerits of the model, because of its openness and flexibility, Frith's model stands as a promising framework of reading acquisition.

Reading development in Indian orthographic context. Learning to read in Indian Orthographic context provides a relatively new area of investigation. The different developmental models of reading discussed are all based on alphabetic script where phonology plays an important role in the acquisition process. The semi-syllabic Indian writing system is a mixture of syllabic and alphabetic principles. Researches on Indian languages like Hindi,
Oriya, Kannada, show that phonology does not play important role in reading acquisition (Prakash, 1987; Prakash et al, 1993). Analysis of reading performance of children during early grades in Indian Languages like Kannada and Hindi established the following stages in the process of literacy acquisition (Prakash, in press).

Stage one. Unable to read (Unable to identify the letters)

Stage two. Reading basic letters (with inherent 'a') without being able to decipher the associated vowel part of the letter (e.g., reading, 'ga' for 'gi')

Stage three. Letter by letter decoding.

Stage four. Proficient way of reading. Both in reading and writing, children do not find any "non-words" difficult.

In sum, as the underlying features of Indian languages differ from that of western language, it needs further research to identify the stages of literacy acquisition in Indian languages. Further, review of literature in this section show that reading is acquired through various stages and attainment of various skills at these stages are dependent on several factors. This creates differences and variability of reading acquisition among children resulting in problems in reading. In the next section some of these problems will be highlighted.

**Problem in Reading**

Reading ability is a product of several factors. It is not entirely predictable from age and IQ. Some children of normal or above normal intelligence have difficulty learning to read and write despite adequate backgrounds and educational opportunities. These children are sometimes referred to as
'dyslexic'. Moreover, reading is a complex skill which depends on several component subskills. Impairment in any of these subskills in varying degrees may cause reading problems. Attempts have been made to find out the causes of reading disability. The reading disabled child has been characterised as suffering deficit in the performance of one or more cognitive processes crucial to reading and writing. Rutter et al., (1973, 1976) correlated reading with intelligence in order to define children with poor reading ability. Two groups of children were separated; children whose reading could not be accounted for by low intelligence from those whose reading was due to lower level of cognitive functioning. The two groups differed. Specific reading retardation was associated with speech and language difficulties, while general reading backwardness was related to developmental delay in a number of functions (Rutter & Yule, 1973; Rutter, Tizard, Yule, Graham & Whitmore, 1976). In this section discussion will be made with regard to reading problems of dyslexics and reading disabled children.

Dyslexia/Reading disability. Reading disabled ("Specific reading retardation"/ "developmental dyslexia") children suffer from a deficit in the performance of one or more cognitive processes important to reading. They form a small group of poor readers having average or above average intelligence. Disabled readers usually find problems in reading, fail to recognise common words and make decoding errors (Guthrie & Seifert, 1977; Mason, 1975; Shankweiler & Liberman, 1972). They also reveal reading and spelling errors and in general exhibit language deficit. To sum
up, disabled readers suffer a kind of "performance" or "process" deficit. Psychologists have tried to explain reading disability in terms of deficits in perceptual processes, serial ordering, attention, short-term memory and linguistic processing. Process oriented theories cannot account adequately for the severity or specificity of the disorders. However, the pattern of results across studies show that disabled readers have problem in complex serial learning tasks like rapid scanning, encoding (McIntyre et al, 1978; Morrison et al, 1977; Stanley & Hall, 1973). Reading disability has been rightly described as a "failure to master reading at a level normal for age when this failure is not the result of a generally debilitating disorder such as mental retardation, major brain injury, or severe emotional instability" (Gibson & Levin, 1975).

From a close analysis of the nature and acquisition of reading disability, three tasks stand out as most important accomplishment of reading. First, the child must master the rules underlying symbol-sound correspondences in English. Second, the child must be able to use those rules and must refine the basic word-decoding operations. Third, for the development of automatic decoding skills, the child has to master complex set of processing and comprehension skills. The three tasks are developmentally linked and difficulty in any of these aspects may result in reading disability.

Researchers have given attention to different types of dyslexia. Two groups of dyslexics are often compared. Developmental dyslexia is defined as "a specific reading disorder occurring in otherwise intelligent children provided with an
adequate background and educational opportunities" (Jorm, 1970). On the contrary acquired dyslexia refer to the reading problems suffered by normal readers as a consequence of brain damage. There are different varieties of dyslexia resulting from impairments of the brain. Marshall and Newcombe (1966, 1973) by applying information-processing models to the study of acquired dyslexia suggested that in dyslexia the component units (modules) of reading system become separated and dissociated. On this basis, several types of acquired dyslexia such as phonological dyslexia, surface dyslexia, deep dyslexia, etc were identified. Phonological dyslexia chiefly results from impairment of grapheme-phoneme correspondence route. Surface dyslexia occurs due to moderate or severe impairment of the "direct route" from visual written forms to semantic representations (Marshall & Newcombe, 1973). Impairment of the visual analysis system results in attentional dyslexia (Shallice & Warrington, 1977). Deep dyslexics find problem in reading unfamiliar words and are liable to several types of reading errors. A list of types of acquired dyslexia with the specific characteristics are given in table-1 (from Ellis, 1985).

Study of varieties of dyslexia helps in finding out the causes of reading failure. Knowledge of the different causes or factors of reading failure give some understanding of how does a child acquire reading specific modules and structure them effectively. The next section has tried to focus on the factors affecting reading development.
### Table - 1

Types and characteristics of Acquired Dyslexia (Ellis, 1985, P.46)

<table>
<thead>
<tr>
<th>Type of Dyslexia</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Attentional dyslexia (alias literal dyslexia).</strong></td>
<td>Patient makes frequent visual segmentation errors when shown groups of words. Difficulty naming letters in strings but not letters in isolation.</td>
</tr>
<tr>
<td><strong>2. Letter-by-letter reading (alias word-form dyslexia).</strong></td>
<td>Patient appears to name each letter of a word either aloud or subvocally before identifying the word, therefore reading time increases with the number of letters in the word. According to Warrington and Shallice (1980) reading is mediated via the patient's intact spelling system.</td>
</tr>
<tr>
<td></td>
<td>Main references: Warrington and Shallice (1980); Patterson and Kay (1983).</td>
</tr>
<tr>
<td><strong>3. Visual dyslexia.</strong></td>
<td>Patient makes frequent visually based errors in word recognition despite sometimes being able to name all the component letters of the target word. Deficit possibly due to &quot;slippage&quot; within the visual word recognition system.</td>
</tr>
<tr>
<td></td>
<td>Main references: Marshal and Newcombe (1973); Newcombe and Marshall (1982).</td>
</tr>
<tr>
<td><strong>4. Phonological dyslexia.</strong></td>
<td>Patient is able to read many familiar words aloud with understanding, though may have some problems with function words and inflected words. No effects of regularity, imageability, or length. Virtually unable to read unfamiliar words or non-words aloud suggesting impairment of grapheme-phoneme conversion and/or phonemic assembly.</td>
</tr>
<tr>
<td></td>
<td>Main references: Beauvois and Derousne (1979); Shallice and Warrington (1980); Patterson (1982).</td>
</tr>
<tr>
<td><strong>5. Non-Semantic reading (alias direct dyslexia).</strong></td>
<td>This occurs in some patients having &quot;presenile dementia&quot;. In fact word naming (and apparently nonword naming) despite a lack of any indication that the patient understands the words being read. Arguably reading aloud is sustained by intact connection between visual word recognition units and phonemic word production units despite disintegration of the semantic system.</td>
</tr>
</tbody>
</table>
6. Surface dyslexia (alias semantic dyslexia).

Patient appears to read by phoneme mediation. Some whole-word reading retained, but patient may misinterpret homophones showing that final access to the semantic system is via the auditory word recognition system. For many words the patient attempts to assemble a pronunciation with a consequent liability to "phonetic" errors; other errors appear to be visual approximation similar to the errors of visual dyslexics. Regular words are read more successfully than irregular words. Principal deficits appear to be disconnection of visual word recognition system from the semantic system together with unavailability either of some visual word recognition units or some connections between those units and the corresponding phonemic word production units.

Main references: Marshal and Newcombe (1973); Marcel (1980); Shallice and Warrington (1980); Henderson (1982).


A complex syndrome whose central, defining symptom is the occurrence of semantic errors in single-word reading. Other symptoms include visual, visual-then-semantic and derivational errors, difficulty reading abstract words and function words, and an almost total inability to read nonwords. Several components of the reading system have been lost (e.g., Morton & Patterson, 1980), and Coltheart has argued that the remaining reading capacities are largely those of the right hemisphere.

Main references: Marshal and Newcombe (1973); Coltheart, Patterson and Marshal (1980)
Factors Affecting Reading Development

Reading ability can be facilitated by an understanding of some crucial factors which affect reading performance. There can be a large number of factors which might affect reading. In this section only few factors relevant to the present study will be discussed. Some of the factors are simultaneous-successive processes, IQ difference, memory, reading awareness, teaching methods, orthographic factors, etc. Metalinguistic and verbal processing factors will be discussed in detail. Other factors will be briefly reviewed.

Information Processing

Reading is considered as an information processing behaviour where the reader processes three kinds of information, grapho-phonetic, syntactic and semantic. Oral reading is concerned with the process of grapheme-phoneme conversion and reading comprehension is concerned with the process of inferring the ideas and information conveyed. Reading is described as 'a psycholinguistic guessing game... Efficient reading does not result from precise perception and identification of elements, but from skill in selecting the fewest, most productive cues necessary to produce guesses' (Goodman, 1980, P.498).

The information processing approach specifies the manner in which an individual processes information in reading as well as in problem solving task. Reading comprehension depends on two factors; one, the information contained in the text and the other, the background information available to the reader. Comprehension is an outcome of an interaction between these two sources in which the reader draws inferences from the text by
supplementing missing links from his own information background.

Studies have attempted to relate reading achievement to information-processing strategies by using simultaneous and successive processing tasks. Results have pointed to the conclusion that children with different reading abilities process information differently. Studies comparing dyslexics and normal readers revealed that the dyslexics suffer from phonetic processing difficulties (Tallal, 1980; Tallal & Stark, 1982). Processing mechanism refers to the rate of information processing essential for encoding simultaneous or successive events. Poor readers face difficulty in processing rapidly presented successive events because of their poor phonetic processing capacity. They also demonstrated poor ordering tasks (Katz et al, 1983). As an important factor in reading acquisition, these two processes are discussed here under.

**Simultaneous—Successive Processes.** Luria's (1966a, 1966b) observations suggested that one's linguistic functioning includes both simultaneous and successive processing. Using Luria's concept, Das, Kirby and Jarman (1975, 1979) proposed a model of information processing. The model assumes that two modes of information processing are available to the individual simultaneous and successive. Simultaneous processing refers to the organisation of individual stimuli into simultaneous arrays and are involved in understanding complex conceptual linguistic relationships. Successive processing refers to processing of information in serial order. These two modes of coding information are found to be related to reading and verbal
comprehension (Cummins & Das, 1977). The individual selects either or both modes of processing depending upon his or her habitual mode of information processing as determined by socio-cultural, genetic factors and demands of the society (cited in Sahoo & Devi, 1984).

In one of the earliest studies, Leong (1974) compared IQ matched average and disabled readers on simultaneous-successive tests. Disabled readers were found to be inferior on both the modes of information integration. Cummins and Das (1978) in a test on grade three children observed a significant relationship between successive processing and the ability to analyse surface and deep structure ambiguities and also to performance on verbal reasoning task. Sahoo (1986) taking grade four good and poor readers established that reading proficiency is related to verbal successive and verbal simultaneous processes. In another study Sahoo and Devi (1986) also found good readers to be superior on both the modes of information integration. It was also observed that at the beginning stage of reading Oriya orthography, a greater dependence on successive processing was noticed. Thus, different writing systems because of their demands at the stage of decoding could be promoting different habits of information processing in their readers. An orthography having poor grapheme-phoneme correspondence (as in English) requires an holistic word scan or proficiency in simultaneous scanning. On the contrary, in the case of logographic and syllabic orthographies proficiency at successive scanning would be required for correct decoding of the print (Sahu & Kar, 1994).
Reading, being a cognitive behaviour, relates to different modes of information processing at different stages of reading acquisition. McLeod (1971) observed that at higher levels of reading competence simultaneous processing is more important than successive processing. Similar observations were reported by Das and his colleagues (1975, 1979) when they said successive processes were important at initial stages of learning decoding skill whereas simultaneous processes may be helpful for higher levels of skilled reading. The findings of Prakash (1987) also corroborated the previous results. He further stated that children adopted different strategies in their course of literacy acquisition. To conclude the majority of the studies reviewed suggest that simultaneous-successive processes are related to reading.

**IQ and Reading**

For a long time, reading specialists have been interested in the relationship between reading and intelligence. Most of the studies yield a positive but moderate relationship between intelligence and measures of reading ability. Jensen (1980, 1981) in his book "Straight Talk About Mental Tests", stated a correlation of .68 between reading comprehension and intelligence. This relationship was questioned since it appears to be in the higher side. Stanovich, Cunningham and Feeman (1984) in a recent review reported that the correlations vary greatly among different studies in the range of 0.3 to 0.7 which again varies with age. Correlations in the early elementary grades, middle grades and adult groups were found to be 0.3 to 0.5, 0.45 to 0.65 and 0.68 respectively.
Some conflicting results were also observed. Some hyperlexia children with superior decoding ability were found to have IQs in the retarded range. In spite of superior decoding skill, these children were found to be deficient in reading comprehension (Aram, Rose & Horwitz, 1984). The study of developmental dyslexia also contradict the positive correlation between IQ and reading ability. It can be concluded from several research findings that between the two components of reading processes, that is comprehension and decoding process, latter is independent of measured intelligence.

A low relationship is found between the non-verbal intelligence tests like Raven's Progressive Matrices and reading (Prakash, 1987). This may be due to the fact that these tests contain fewer reading related subskills (Weaver & Rosner, 1979 as cited in Stanovich et al., 1984). Thus, the relationship between reading and intelligence is not that consistent and direct.

Memory and Reading

Memory is another factor influencing reading. Learning to read usually involves both visual memory (visual appearance of letters and words) and verbal memory (verbal labels of letters and words). Jorm(1979) suggested that reading failure can be attributed to an auditory short-term memory deficit. Short-term memory is the cognitive basis for both word recognition and comprehension and is necessary for rapid encoding and retention. Some findings contradict the above view and instead specify the problem of the disabled readers. Byrne (1981) argues that reading disabled children suffer from a failure to recruit linguistic
processes for functions outside their adaptive specialisations, leading to poor auditory memory and poor speech conceptualisation. An explanation of poor phonetic memory leading to poor comprehension was given by the proponents of memory deficit hypothesis. According to them the print is phonetically encoded before comprehension takes place. Hence poor STM causes an inefficient phonetic memory code which in turn result in poor comprehension. Phonetic encoding which requires efficient STM is an important factor in reading, but it cannot be claimed to be the sole factor in all cases of reading failure (Tunmer et al, 1984). Bauer (1979) compared the normal and disabled readers on the recency and primacy portion of the serial position curve. The two types of readers did not differ in the recency portion of the curve suggesting that no difference in short term memory capacity existed. Thus, memory can not be said as the sole factor in all cases of reading failure. Nevertheless, it is an important determinant in reading acquisition as revealed in various studies.

Reading is influenced by the explicit knowledge of the principles of language technically known as "metalinguistic awareness". A general discussion of linguistic awareness with its components is embodied in the next section.

**Metalinguistic Awareness**

Metacognition is a broad term referring to "thinking about thinking itself rather than objects of thinking" (Flavell, 1977). Cazden (1972) first used the term metalinguistic awareness to study general cognitive and language development. These different meta-processes control our mental operations in various ways like
implicit-explicit intuitions about language structures, unconscious control over language usage, appreciate jokes, lexical syntactic ambiguities, identify inconsistencies and adequacy in a message, etc. Reading skill involves two primary stages that is encoding the symbols and deriving meaning from the written script. For this, proper understanding of the properties of language is very essential.

The growing literature on the role of cognitive processing and language awareness in relation to reading has become very popular among the reading researchers. The term language awareness is differently used at different times as metalinguistic awareness, metagacognitive awareness etc. Metalinguistic refers to what the learner knows about his/her own language behaviour and are central to reading acquisition. Language awareness principally relates to the monitoring, control and repair of language (i.e. both structural and functional features) and to use language as "disembedded modes of thinking".

The term language awareness, metalinguistic awareness is defined in various ways. Luria (1946) described language awareness in the following words—a word may be used but not noticed by the child and it frequently seems like a glass window through which the child looks at the surrounding world without making word itself an object of his consciousness and without expecting that it has its own existence, its own structural features".

Cazden (1974) viewed metalinguistic awareness as the transparent and opaque use of language and is less easily and
less universally acquired than the language performance of speaking and listening. Ryan (1980) explained it as the ability to focus attention upon the forms of language in and of itself, rather than merely as the vehicle by which meaning is conveyed. It is the deliberate manipulation and control over language.

Tunmer and Herriman (1984) suggested "metalinguistic awareness may be defined as the ability to reflect upon and manipulate structural features of spoken language, treating language itself as an object of thought as opposed to simply using the language system to comprehend and produce sentences. "Ehri (1971) conceptualised it as the implicit-explicit intuitions about the structural and functional properties of language. Thus, the concept of metalinguistic awareness seems to "involve all the capacities and activities concerning language and language judgement which are not themselves a part of (or very closely tied to) production and comprehension process". These include "any reflections, ideas, knowledge, rules, etc., concerning language structures, functions or the rules for its use....." (Sinclair, 1981, pp.44-45).

To sum up, all these definitions of metalinguistic awareness chiefly focus on the inherent characteristics, principles concerning language and not merely taking language as it is. It is more than mere production and comprehension processes. The following section will discuss the various component levels of language awareness and their relationship to reading.

Nature of Metalinguistic Awareness and its Relationship with Reading. Metalinguistic ability has been shown to correlate with cognitive development, literacy skills and to some extent, with
oral language skills (Gleitman & Gleitman, 1979; Hakes, 1980; Menyuk, 1984; Ryan & Ledger, 1984; Smith & Tager-Flusberg, 1982). Ehri (1979), for example, argues that learning to read is responsible for promoting metalinguistic awareness. Others, such as Mattingly (1972), have argued that metalinguistic awareness is a prerequisite for reading. Menyuk (1984) suggests that progress in metalinguistic awareness is dependent on the levels of oral language skills. Researches reported that metalinguistic awareness at phonological, lexical, syntactic and pragmatic levels is the cardinal factor in successful reading acquisition. Poor readers' performance in phonemic analysis, ambiguity, synonymy Judgement, detection of message inconsistency were found to be poorer compared to the normal readers (Garten & Pratt, 1989; Tunmer, Pratt & Herriman, 1984).

Metalinguistic abilities are evident during the early periods of language development through imitations, monologues and invented words (Menyuk, 1976). However, these abilities continue to mature into middle childhood and adulthood. Developmental studies indicate that the ability to make various judgements develop in time as the linguistic knowledge matures. It has been further observed that some types of intuitions develop before others and their context of application also changes with maturation (Menyuk, 1977). Flood and Menyuk(1979) found a significant correlation between level of reading and success in aspects of metalinguistic processing. At the beginning of the reading process, translation of written material into oral language categories is required and this, in turn, requires
awareness of these categories and relations. As structural oral language is established, the process gradually becomes automatic. Thus, as the act of reading requires readers to stand back from language, that is, to analyse it as an object, the strong correlation between metalinguistic ability and reading level argues that reading is a metalinguistic task in which conscious knowledge of linguistic structures is required (Menyuk & Flood, 1981).

The various definitions offered for metalinguistic ability implicate either one or other of the following two components. (a) the need for stucturalising specialised knowledge in particular ways, and (b) procedures for accessing that knowledge. For example, some stress on the need for conscious knowledge of the structures and functions of language (Chomsky, 1979; Downing, 1979), whereas others focus the need for control over attention and selection (Cazden, 1974; Hakes, 1980). Anderson (1982) also emphasised the need to structure language and Brown, Bransford, Ferrara and Campione (1983) described metacognition as involving both one's knowledge of cognition and one's control over cognitive abilities.

Bialystock and Ryan (1985) identified two such processing components, called analysis of knowledge and control of linguistic processes. These are represented as dimensions in the cognitive framework. The values on these dimensions increase steadily from one end to the other. The four quadrants reflect values for low knowledge, low control, low knowledge/high control, high knowledge/low control, high knowledge/high control (see Fig.1). Different language tasks depending on their levels
Fig. 1 Cognitive framework underlying the development of language abilities. (Ellen Bialystok, 1985)
of skills are located in the matrix. A conversation, for example, requires minimal degrees of both analysed knowledge and cognitive control and is located in the quadrant specifying low level of skills. On the contrary, a metalinguistic task requiring much higher levels on both dimensions will occupy a higher position in the matrix.

Analysis of linguistic knowledge is the skill responsible for structuring, organising and explicating the child's implicit knowledge of language. Metalinguistic problems require more analytic or explicit knowledge that was used implicitly for conversation (Bereiter & Scardamalia, 1982; Carpenter & Just, 1981). The analysed knowledge develops in response to a number of factors and the key one is literacy. Literacy promotes analysis of linguistic knowledge (Ehri, 1979; Perfetti, Beck & Hughes, 1981). Literate subjects irrespective of schooling experience showed greater analysed knowledge in correcting grammatically deviant sentences as compared to their nonliterate counterparts (Scribner & Cole, 1981). Menyuk (1984) argues that reading depends on the degree of knowledge of any particular structure which in turn would reflect the extent of analysis.

Cognitive control involves the selection and coordination of information. As the metalinguistic problems require the integration of more types of abstract information, they demand high levels of control (Hakes, 1980). Scribner and Cole (1981) report that schooling (not literacy) was significant in predicting the ability of subjects in a task that makes high demands on control but only moderate demands on knowledge.
The development of the ability to solve metalinguistic problems is viewed as the joint elaboration of skill in the two cognitive dimensions of analysed knowledge of language and cognitive control of executive procedures. The process of learning to read is viewed in terms of three stages. First, analysed knowledge of the functions of reading is necessary that is the child has to realise that print also conveys meaning in addition to oral language. Second, analysed knowledge of the features of reading and control over that knowledge are required (Downing, 1979; Rozin & Gleitman, 1977). Finally, in extracting the meaning, the child needs the control to coordinate attention to the formal features of language. Karmiloff-Smith (1986) developed a model of reading in which children pass through three phases of development for acquisition of skill. The first two phases involve essentially analysing the knowledge base, moving from implicit to explicit knowledge. The third is the control phase in which execution is learned under contextually relevant conditions. Thus, development of metalinguistic skill proceeds through the development of these two skills.

Valtin (1984) postulated three stages of developmental sequence of language awareness. The first stage is that of unconscious awareness of or automatic use of language. At early ages the child is not aware of his or her speech but becomes aware if that speech act fails. Mattingly (1972) viewed the important role of metalinguistic awareness in reading but spontaneous correction of speech found in speech may not be a conscious attempt by the child. First 5 years seem to represent gradual development from extra-linguistic to intra-linguistic
references both in speech utterances and later in metalinguistic awareness. The second stage according to Valtin (1984) represents the actual awareness or the spontaneous creative manipulation of language. This stage reflects a general cognitive development. Children become able to abstract language from action and meaning from the context and think about some properties of the forms of language. Piaget (1969) characterises this as the emergence of concrete operational thought showing the capacity to control and coordinate two stimulus dimensions simultaneously. Piaget describes it as decentration, that is the ability to decenter and shift one's attention from the message content to the properties of the language. Thus, poor metalinguistic skills may be due a developmental lag in decentration process. It appears that the linguistic manifestation of the Piagetian cognitive developmental changes occur during middle childhood when the child is in concrete operational period. Several researchers viewed the development of metalinguistic skills in mid childhood to be linked to Piagetian process of decentration (Lundberg, 1978, Hakes, 1980; Tunmer, Herriman & Nesdale, 1988). Evidence of child's creative manipulation of language forms are reflection of the child's mastery of language rules (Downing & Valtin, 1984). The third stage is of conscious awareness representing the child's ability to deliberately focus and manipulate linguistic units. This explicit knowledge of language is the result of schooling. Donaldson (1976) and Olson (1972) explained the development of metalinguistic awareness to be linked to reading and writing. Though some researchers like Mattingly (1972) and
Calfee (1977) suggested the importance of some aspects of metalinguistic awareness, as phoneme awareness were prerequisites for learning to read but development of metalinguistic skill was linked to the normal language acquisition. On the other hand, the interactionist view suggests that a certain amount of metalinguistic awareness may be a pre-requisite for literacy acquisition, whereas the literacy acquisition process may further facilitate the development of metalinguistic awareness (Ehri, 1979). This view raises the question as to which aspects of linguistic awareness are acquired before learning to read and which others are the result of reading/schooling.

Andersen (1982) suggested three developmental stages of language awareness. They are dimly conscious stage, preconscious speech monitoring stage and analytic stage (Slobin, 1978). In the process of development children become able to abstract language from the action and to think about the properties of language. Although it is evident to some extent that linguistic awareness must be involved in reading in some way, but the exact nature of relationship and its role in developing reading skill is not very clear. Studies done on reading disability reveal poor performance of retarded readers in ambiguity judgement, phonemic analysis, synonymy judgement, detection of message inconsistency etc. It may be due to readers poor ability either to code or synthesise information for storage and retrieving them when required (Vellutino, 1979).

Dreher and Zenge (1990) could predict children's reading achievement at the third and fifth grades on the basis of their metalinguistic awareness at the first grade level. This suggests
the effect of metalinguistic awareness on reading acquisition. In other words, competence in reading requires knowledge of the underlying principles, rules concerning language structure and its use. Knowledge of these enables the reader to choose skills and strategies appropriate to their reading tasks. Scholes and Willis (1987a, 1987b) in a study on metalinguistic task reported that the performances of preliterate children and illiterate adults to be different than literate adults on measures of phoneme segmentation and grammaticality judgement of sentences. All these researches stress on the development of metalinguistic awareness as a consequence of literacy acquisition, but the exact nature of relationship is yet to be established. Downing (1984) viewed some of the metalinguistic abilities to be prerequisites, some facilitators others as consequences of reading. Numerous studies thus implicate the relationship between reading and metalinguistic awareness but the relationship may be quite complex depending on the multiple representations of metalinguistic awareness.

Tunmer and Bowey (1984) have outlined four broad levels of language awareness-phonological, lexical, syntactic and pragmatic awareness. Though various aspects of language awareness are found to play important role in reading acquisition, researchers differ with regard to their specific functions and the order of their emergence. Rozin and Gleitman (1977) suggested that the order of emergence is dependent upon the level of linguistic representations. The deep representation (i.e. phoneme) is easier than the structural and functional representation and thus can be
said to appear earlier. On the contrary, Flavell and Wellman (1977) viewed the pragmatic level must be emerging prior to others. Nesdale and Tunmer (1984) suggested that the difference in estimate of the order of emergence may be a function of specific tasks used and the difficulty level of the task.

However, from the review of literature it is clear that language awareness plays a major role in the process of reading acquisition but the importance of different aspects of metalinguistic awareness at different stages of acquisition varies. The following section will highlight the various component levels of language awareness and their role in reading process.

**Phonological awareness and reading.** Internal representation of speech is referred to as phonological coding. Phonological awareness refers to "child's explicit knowledge that speech consists of syllabic and phonemic segments" (Jorm & Share, 1983). It is viewed as a bridge between language and literacy acquisition (Morais, 1991a). As the alphabetic writing system represents the speech at the phonemic level, it is necessary for the child to be aware of phonemic units of speech. Review of several studies reveal a high correlation between phonological segmentation and reading proficiency.

Phonological recoding serves two important roles in reading. Firstly, it is used as a back-up mechanism i.e. the beginning readers use this to identify a word when their visual route fails. Secondly, phonological recoding is used as a self-teaching mechanism which helps children to identify words visually. Phonological recoding is important for the beginner readers as they are less likely to identify a word visually. Rozin (1978)
views the child's phonological knowledge as proceeding through three stages. In the first stage the child has only vague knowledge of speech and is unable to take the benefits from an alphabetic script. At the second stage, the child's awareness of phonemic structure of speech develops and this he uses in learning to read. In the third stage, phonological access becomes automatic.

Studies by Liberman, Shankweiler, Fischer and Carter (1974) and Fox and Routh (1975) have shown that the ability to segment words into phonemes develops when the child begins reading instructions. Rosner (1971) further showed that children trained extensively in phonological awareness developed better reading skills. Researches show that the majority of the children below seven years of age cannot perform well on phoneme segmentation (Nesdale et al., 1984; Tunmer & Bowey, 1984).

Adult literature also shows that illiterates are poor at analysing speech into phonemes compared to adults who learned to read late in life (e.g. Morais, Cary, Algeria & Bertelson, 1979). However, a contrasting result was found by Morais and his colleagues. They observed that some forms of speech manipulations such as rhyme recognition and syllabic segmentation develop spontaneously while phonemic segmentation skills do not. This suggests that linguistic awareness at phonemic level is associated to the alphabetic system (Morais, et al, 1979). Ehri (1979, 1980, 1984) specified the importance of alphabetic system in helping children to develop mental representations of phonemes for spoken language.
Bradley and Bryant (1983, 1985) in several longitudinal studies observed a causal link existing between early sound categorisation ability and later literacy acquisition. Share, Jorm, Maclean and Mathews (1984) established the fact that phonemic awareness at school entry was the best predictor of reading achievement after 2 years. In another study Tunmer and Nesdale (1985) reported that children lacking in phonic awareness could not read pseudo words.

Phonological awareness includes awareness of phonological strings (awareness of phonological length, sound similarity etc), awareness of syllables and phonemes and awareness of phonetic features (Morais, Algeria & Content, 1987, cited in Morais, 1991). Some recent studies reported that knowledge of nursery rhymes facilitated and predicted children's success in reading when phonological skill were taken into account (Bryant, Bradley, Maclean & Crossland, 1989; Maclean, Bryant & Bradley, 1988). The Brussels group (Morais and associates) agreed with the Oxford group (Bradley, Bryant and associates) in saying that phonological awareness precedes literacy acquisition but disagreed with them that rhyming ability taps phonemic awareness. Consistent with this, Yopp (1988; cited in Morais, 1991) in a series of phonological awareness tests on children found the rhyming tests grouped separately from other phonemic tests. Prakash and Chandrika (in press) in an Indian study also revealed a complex relationship with varying factor patterns at different grade levels.

Researches done on the development of phonological awareness show that the ability to some extent develops with age. Hakes (1980) observed that the four and five year olds faced difficulty
in phonemic segmentation task, but by age 8 most children could accomplish this task. Read et al, (1986) however, gave a different view by suggesting that phonemic segmentation skill does not develop with cognitive maturation. Researches have also found that the majority of children below seven years find it difficult on phoneme segmentation tasks (Nesdale et al, 1984; Tunmer & Bowey, 1984).

At this point it is worth mentioning some of the Indian studies relevant to these issues. The Indian writing system is a semisyllabic system wherein the graphemic characters can be systematically analysed into consonant and vowel components. Sahoo (1986) explained the difficulty of poor readers in connecting written symbols with their semantic representation in terms of their deficient awareness of the phonetic structure of language. This suggests that phonological skill may play an important causal role for individual differences in reading ability but it is not linked to literacy in general but to alphabetic literacy in particular. Prakash, Rekha, Nigam and Karanth (1993) conducted a series of three studies in Indian context to show the development of phoneme awareness. First study consisted of Kannada speaking school children in the age range of 6-9 years from Grades 1 to 3. These children performed poorly on phoneme oddity and phoneme deletion tasks but fairly well on rhyme recognition and syllable deletion tasks. This suggests that phoneme awareness is not an important factor in non-alphabetic literacy. The second study consisted of Hindi speaking literate and illiterate adults. Hindi (an Indo-Aryan language) is based on
Brahmi script and shares common orthographic features of Kannada (an Indo-Dravidian language). These Hindi speaking subjects were found to perform well in rhyme recognition and syllable deletion tasks but did poorly on phoneme deletion tasks suggesting that literacy in a semi-syllabic script like Hindi is inadequate for the development of phonemic awareness.

Researches also differed in their opinion with regard to the relationship between phonemic awareness and reading. Some view phonemic awareness as a prerequisite to learning (Mattingly, 1979), whereas the interactive view held phonological sensitivity both contributor and a consequence of learning to read (Ehri, 1979; Goldstein, 1976).

Several studies show that training in auditory analysis and blending skills may have positive effects on reading. Elkonin (1973) developed a training procedure based on a visual model that made the analysis of task more concrete. According to Elkonin (1973), prereaders using this method mastered phonemic analysis relatively quickly and also showed improvements in various aspects of learning literacy. In a latter study Rosner (1974) trained 4-5 yr olds and nonreading first graders on phoneme segmentation tasks. Post test scores on phoneme skills showed higher performance than the control group who did not receive any training. An analysis of the above research findings reveal the fact that speech segmentation at the phonemic level does not develop with maturation but is a consequence of learning to read. It facilitates learning to read in both alphabetic and non-alphabetic writing system (Singer, 1984) and develops gradually.
A deficiency in phonological skill could contribute to reading difficulties in two different ways. First, studies with normal and disabled readers have specified the two efficient paths to the lexicon. The normal readers process the regular words by both the phonological and orthographic path. Disabled readers because of their poor phonological code showed a smaller regular word advantage (Olson, Kleigel, Davidson & Foltz, 1984). Barron (1984) also supported this prediction. A different view of how a deficit in phonological skill could cause reading problems is presented by Venezky and Massaro (1979). According to this view phonological skill helps orient the beginning reader to the orthographic structure of words that may latter be employed. Thus, any weakness in phonological coding would hinder the development of word recognition abilities.

Analysis of teaching practices and results implicate that phoneme segmentation is an important predictor of reading acquisition. Thus it should be taught to children by the most effective method based on very slow stretched pronunciation and proper articulatory and auditory clues so that the child can perceive the separate sounds (Liberman, 1974; Elkonin, 1973). However, literacy skills in a semisyllabic system are inadequate for the development of phonemic awareness (Prakash, Rekha, Nigam & Karanth, 1993). It needs further studies to establish the exact nature of relationship between literacy and language analysis. Children seem to develop syllabic segmentation skills naturally to some extent, but specific training facilitates conscious phonemic manipulations.
Review of literature thus shows that phonological awareness is related to alphabetic writing and is a forerunner in reading acquisition process. This awareness develops gradually but requires some instructions for it.

Word Awareness and Reading. The knowledge of the reader to treat the form/word as "psychologically real" unit of language can be known as word awareness or lexical awareness. Words are abstract entities and as units of language are different from phonemes, syllables, phrases or sentences. Word awareness or lexical awareness plays an important role in reading acquisition process. This helps the child to understand the relationship between spoken and printed words. There are two aspects of word awareness that must be mastered to understand the relationship between spoken and written words. First, the child must be aware of the word as a unit of spoken language. Secondly, it involves awareness of word as a unit of printed language. Researchers commonly confound the two aspects with a third, i.e., the comprehension of metalinguistic term word (see Tunmer & Bowey, 1980). In other words, word awareness helps to think about the difference between word and letter independently of its meaning.

Children lack awareness of the distinction between a "word" and its referent and sometimes confuse sounds with words. It seems easier for them to discriminate sounds (phonemes) than to determine the difference between a single member of a form class and members of different form classes (Downing, 1970). Some children begin by viewing any utterance as a word, progress to identifying only meaningful utterances as words, and then equate words with sounds (phonemes).
A variety of methods are employed to study and measure word segmentation skill. Karpova (1977) measured it by counting, tapping, separating words in a spoken sentence. Downing assessed children's understanding of the term by asking them to define a word and why a word is a "word" etc. Downing and Oliver (1974) asked children to distinguish between real words and nonsense words orally presented to them. Berthoud-Pappandropoulou (1978) measured it by asking children to give examples of words with certain properties like a long word, a short word, a difficult word, etc. along with justifications. Symbol substitution and word creation tasks were also used to measure awareness of arbitrariness of language in Oriya speaking children. In symbol substitution, children are required to substitute one meaningful word for another, on the other hand, in word creation tasks a nonword or congruent word has to be substituted for a meaningful word in a fixed sentence frame. Both the tasks measure children's understanding that a word has its own existence.

The first experimental investigation of children's understanding of word in relation to spoken language was done by Downing (1969, 1971). 5 year old children were tested in an oral discrimination task in which they were asked to say "yes" or "no" to a word or nonword respectively. None of Downing's 13 subjects responded 'yes' only to words. Extending this study to a wider age range of children, Downing and Oliver (1974) obtained the same results. Youngest children (4 years, 5 months to 5 years, 5 months) were found to answer 'yes' indiscriminately and the oldest children confused phonemes and syllables with words.
Johns (1979) also reported similar findings with regard to the child's limited understanding of the term word.

In a latter study, children's comprehension of the metalinguistic term word was assessed along one dimension at a time (i.e. to compare words with sounds, or to compare one-word stimuli with two-word stimuli). Children showed mastery in the classification skills required in a unidimensional discrimination task (Downing & Oliver, 1974; Johns, 1979). Thus, lexical awareness is not very easily acquired by young children. In a review of five studies, Tunmer and Bowey (1984) observed that children below seven do not achieve awareness of word perfectly. This may be as there is no physical basis for isolating words in normal speech. A study on 160 French speaking children, aged 4 to 12 years showed a slow development of the concept of word (Berthoud-Pappandropoulou, 1978). In another study, Carolyn Chaney (1989) explored young children's metalinguistic awareness of word boundaries. The years from ages four and half to six and half were found to be a period of vigorous development of word segmentation skills. During this period, children use various complex strategies like phrasal, syllabic and finally a full word strategy. Initially children learn the relationship between a spoken word to a printed word. Gradually from this stage towards the middle childhood period they develop some conscious awareness of words. Often improvement is noticeable over the course of a school year (Downing, 1970).

Templeton (1980) tried to assess word awareness in children of various ages. Four or five year old children equate the concept of word to a particular object or an act. Between the ages from
five and seven, children could separate the concept of 'word' from the observable environment and comment that words are used to name something. From about seven to eight years of age, children's concept of word usually becomes more stable and the structural and semantic features of words may be probed deeply (Templeton, 1980). In an Indian study, Prakash (1987) found a developmental trend in Oriya speaking children.

Children's ability to reflect consciously on words depends largely on the sophistication of their cognitive development (Piaget & Inhelder, 1969) and the amount of print to which they have been exposed. Hall (1976) also viewed that children's ability of segmentation of print was positively correlated with print experience and the knowledge about spaces as cues for word boundaries may be the result of learning to write rather than result of learning to read. Studies specifying marked difference in performance between prereaders and readers on the word discrimination task suggest that the process of learning to read may foster word awareness. Children must master a great deal of information about form classes, written conventions and word referent relationships in order to understand the meaning of the term word. As Downing (1976) rightly suggests by saying that all people pass through a stage of cognitive confusion initially and only after discovering the purpose of a skill, its function, the important elements of the task, they reach at a stage of cognitive clarity. Thus, cognitive clarity about reading may be achieved by mastering the concept of "word" which in turn is influenced by literacy acquisition.
Syntactic Awareness and Reading. Form awareness relates to the ability to reflect on the internal grammatical structure of sentences (Tunmer & Grieve, 1984). Grammatical knowledge requires reading beyond word level. In order to become a skilled reader, children have to understand the internal features of sentences, give judgements about acceptability and structural ambiguities of sentences. It is the ability to attend to a particular aspect of form, analyse the knowledge to make one's implicit knowledge of linguistic structures explicit (Bialystock & Ryan, 1985; cited in Rubin et al, 1990).

The awareness of structural-relational knowledge may play an important role in reading development. Various developmental studies indicate that the ability to make judgements about ambiguous sentences, acceptable / unacceptable sentences, etc develops in time as linguistic knowledge matures (Menyuk, 1977). Mattingly (1979) argues that reading, like metalinguistic abilities is a matter of accessing knowledge of grammatical structures of sentences. Competent readers develop grammatical ability beyond what is required. Poor readers show some dysfunction of syntactic system in reading because of their poor organisational and integrative skills, lack of grammar and complexity of sentence structures (Fry, 1967; Schulte, 1967). Menyuk (1977) suggested from his findings that judgement abilities precede production abilities. Poor readers were found to demonstrate much greater difficulty with production tasks than good readers at every grade level. Fry et al, (1970) compared 7 and 8 year old normal and poor readers in a story telling task about each of 20 pictures. Normal readers showed more flexibility
and complexity in syntactic structure and production in story
telling than that of the poor readers. Bohannon (1979) found a
significant correlation between word-order discrimination task
and reading in five to seven year old children. Vogel (1974)
established differences between normal and disabled readers on
syntactic measuring tasks and morphological tasks. Guthrie (1973)
found the normal readers to be superior to the disabled readers
in selecting grammatically appropriate lexical alternatives for
sentence completion. In another study, Hirsch-Paseket (1978)
observed the good readers to be better able than the poor readers
in appreciating the underlying complexities in verbal jokes among
one to fifth grade primary school going children. Success in
these tasks require better comprehension skill. Poor reader's
inability to organise sentences in a syntactically coherent
manner may be due to their poor comprehending capacity.

Some Indian studies focussing on the development of syntactic
awareness are worth mentioning. Prakash and Mohanty (in press) on
Oriya speaking children in the age range of 5-9 years from grades
1, 3 and 5 found the synonymy judgement scores emerged as the best
predictor of both oral reading and reading comprehension. Sahoo
(1986) analysing the error patterns of poor readers found them to
be deficient in syntactic development and graded oral reading
test. Consistent findings were found by Seigel and Ryan
(1988; cited in Rubin et al, 1990) in which normally achieving
readers were found to differ from the poor readers on correction
of grammatically faulty spoken sentences. Thus, syntactic
awareness may be influenced by reading experience.
The ability to reflect on the internal grammatical structure of sentence vary across the age (Fujiki, Briton & Duton, 1987; Karanth, 1984; Karanth & Suchitra in Press; Tunmer & Grieve, 1984; Vasanta, Sastry & Murthy, 1989). They tried to study the development of grammatical judgement skill. Karanth (1984) studied children in the age of 2 to 14 years on grammatical judgement task. Children below the age of 5 to 6 years were unable to respond to the grammaticality judgement task in a consistent manner. At around 6 years of age they started attempting the task and at about 12 years of age, children showed 80% proficiency in grammaticality judgement (Hakes, 1980; Karanth & Suchitra, in press; Suchitra, Karanth, in press & Van Kleek, 1982). Tunmer, Herriman and Nesdale (1988) also reported an increment in children's performance in synonymy judgement at grade-3 level. These observations support the fact that syntactic awareness develops with age. A possible explanation can be as children grow, they acquire knowledge through reading and writing and this in turn might facilitate the development of grammatical awareness. In a recent Indian study, Karanth, et al., (1992) evaluated performance of 160 subjects (50 school going and 50 non-school going children in the age range of 6-11 years and 30 illiterate and 30 literate adults in the age range of 21-40 years) on tests of syntactic ability, grammatical judgement task on the Linguistic Profile Test (LPT). Result revealed literate and illiterate adults differed considerably in the metalinguistic task involving grammaticality judgement. The difference in performance among school going and nonschool going children in grammaticality judgement can be attributed to reading experience.
In another Indian study by Karanth, Ahuja, Nagaraj, Pandit and Shivashankar (1991, 1992) the difference in performance between illiterate and literate adults was observed. 100 normal adults in the age from 20-80 years were taken as subjects, out of which 67 were literates with 4 years of schooling and 33 were illiterates with no schooling. Illiterate adults scored poorly compared to literate adults on grammaticality judgement task in LPT. This supports the fact that syntactic ability is facilitated by reading.

To sum up, syntactic awareness is very essential for achieving good reading comprehension. It is also clear that inadequate syntactic skills would place constraints on the ability to process written material. Various tasks such as judgement of acceptability of well formed and illformed sentences, ability to make synonymy judgements, ability to detect ambiguity of sentences etc, are used to assess syntactic awareness in children.

Pragmatic Awareness and Reading. The study of pragmatics is "concerned with the meaning of language as it is used to perform the prime function of communicating information and intentions between those participating in any communication sequence" (Pratt & Nesdale, 1984, P.105). Pragmatic awareness operates at the level of propositions and is related to the post decoding phase of reading. It serves as constructive inferential and problem solving process.

The term pragmatics was first used by Morris(1938) for aspects of language that involve users and contexts of use of linguistic expressions. Bar-Hillel (1954) proposed that pragmatics is
concerned with identical expressions whose meanings can only be
determined relative to user and context of use. Stalnaker (1972)
characterised pragmatics "as the study of linguistic acts and the
contexts in which they are formed". A wide variety of pragmatic
tasks have been shown to reflect the syntactic rule applications.
This can be seen as reflecting speaker's attitudes, assumptions
or intentions about the items under discussion.

The development of pragmatic awareness is studied and its
relationship with reading proficiency is assessed by employing
task situations in which the children are required to judge the
statements in terms of context appropriateness. Efficient reading
involves the identification of relationships that exist between
groups of sentences and the context in which they are
incorporated. Pragmatic awareness thus emphasises on the
functional properties of language.

The children at the lowest age level seem to take into account
only physical similarity. With gradual development semantic
similarity is taken into consideration. Children were
experimented with picture classifications and sorting task
appropriately with words. Results suggest mixed picture
reflecting the fact that some sixth grade children sorted the
words exclusively on the basis of physical similarity whereas
others sorted on the basis of semantic criteria and sometimes
by physical similarity (Chapman, 1976). In another experiment
Anglin (1970) found the third and fourth grade children operate
on the basis of semantic features. Correct classification of
sentences is based firstly on the information provided and
knowledge of the meaning of the connectives. Even though the child's syntactic knowledge is well developed, he may still not be able to correctly perform tasks requiring judgements of appropriateness or of meaning similarity. It requires a more abstract level of knowledge. Syntactic awareness operates at the level of sentences whereas pragmatic awareness operates at the level of propositions which requires higher-order comprehension ability involving problem-solving, inferential and constructive processes.

1) Identification of message adequacy/inadequacy.
2) Identification of message consistency/inconsistency.
3) Understanding of message appropriateness/inappropriateness.

Adequate message should be free of any ambiguity. Young children lack the ability to judge adequacy/inadequacy of a message in both comprehension and production task. In a referential communication task, children were asked to select one correct card from a set of four on the basis of the investigator's description which was either adequate, partially adequate or inadequate (e.g. Cosgrove & Patterson, 1977, cited in Pratt & Nesdale, 1984). For the answers of partially inadequate and inadequate messages, they were asked for further information. Result also showed that older children were successful in giving adequate judgement and explaining the reasons. Prakash and Mohanty (in press) in an adequacy judgement task observed that the ability to judge consistency of messages is found to be correlated with oral reading and reading
comprehension. To judge the adequacy of message was seen as the easiest task in which children at Grade 1 level performed at 75% accuracy level and the test performance showed a gradual increment over the grades (with 93% accuracy level in grade-5). It emerged as the second best predictor of reading comprehension at Grade 1 level.

Message inconsistency was assessed on children of 8, 10 and 12 years of age by testing the comprehensibility of stories. When the stories were short, simple, most of the seven year old children could evaluate the logical consistency of sentences. On the contrary contradictory stories were wrongly evaluated by 50% of the children (Pratt, Tunmer & Nesdale, 1982; Tunmer, Nesdale & Pratt, 1983). Prakash (1987) reported that consistency and inconsistency judgement regarding a chain of messages develop with age and is related to reading comprehension at Grade 1, 3 and 5 level.

The third task that is awareness of message appropriateness/inappropriateness was assessed by asking children to match the given messages to a particular situation. In a number of studies by Robinson and Robinson (1976, 1977, 1981), when children were asked to explain the mismatches between the experimenter's descriptions and children's selection, the younger children thought they had not listened carefully whereas older children found fault with inappropriate way of descriptions.

Studies show that the development of effective communication occur during middle childhood. Preschool children were found to show some pragmatic awareness (Wilkinson et al, 1984; cited in
Prakash, 1987). Valtin et al, (1982) showed an age dependency in children's quality of performance. With increase in age, the children were observed to show an increase in the range and frequency of psychological (inferential, abstract and covert) categories. Thus, significant development of this awareness takes place during the first few years of formal schooling (see Shantz, 1975). Some other studies also show that the ability to evaluate the communicative adequacy of complete, incomplete and ambiguous messages shows marked improvement during the early school years (Flavell, Speer, Green & August, 1981; Markman, 1979).

Reading differs from oral interactions in terms of medium of communication as well as in other important ways. Usually the written mode separates the reader in time and space from the writer whereas a speaker and hearer generally have immediate access to each other. This makes possible the use of various verbal (intonation) and nonverbal (gestures, facial expressions) devices to facilitate the hearer's task of inferring speaker's intentions. The lack of such information makes the pragmatics of reading potentially more difficult and could be a factor for children who have not understood the process of pragmatic inference. The pragmatic awareness is also related to rhetorical knowledge which refers to the knowledge that a reader is assumed to have about how statements should be introduced, ordered and interrelated in different kinds of prose so that the message has the best impact on the reader (Graesser, 1981). As pragmatic awareness is a higher order ability involving complex processes like the reader's interpretations, expectations, inferences and attention, it is definitely related to reading. But the question
remains how reading specific aspects of pragmatic inference are significant in comprehension.

To sum up, the development of language awareness or metalinguistic ability, as it is frequently referred to, is a crucial factor in reading acquisition. The conscious control of the explicit knowledge in acquisition of reading skill is termed as metalinguistic awareness. This awareness refers to consciousness at sublexical, lexical as well as sentence levels which operates at phonemic, lexical, syntactic and pragmatic levels (Tunmer & Bower, 1984). The conscious manipulation of language is assumed to occur during middle childhood when the children are introduced to schooling. Metalinguistic ability has been shown to correlate with cognitive development, literacy skills and to some extent, with oral language skills (Gleitman, & Gleitman, 1979; Hakes, 1980; Menyuk, 1984; Ryan & Ledger, 1984; Smith & Tager-Flusberg, 1982). Tunmer and Bowey (1984) developed a conceptual model based on the various researches on metalinguistic awareness. The model explains the hypothesised relationship between metacognition and metalinguistic awareness as follows:

<table>
<thead>
<tr>
<th>Metacognition</th>
<th>Metamemory</th>
<th>Phonological awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Metalearning</td>
<td>Word awareness</td>
</tr>
<tr>
<td></td>
<td>Metaattention</td>
<td>Form awareness</td>
</tr>
<tr>
<td></td>
<td>Meta-socialcognition</td>
<td>Pragmatic awareness</td>
</tr>
<tr>
<td></td>
<td>Metalanguage</td>
<td></td>
</tr>
</tbody>
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(From Tunmer & Bowey, 1984, P.151)

According to this model, metamemory corresponds to
phonological awareness, metalearning corresponds to word awareness, meta-attention corresponds to form awareness and meta-social cognition corresponds to pragmatic awareness. The various types of linguistic awareness changes in accordance with the stage of reading achievement reached by the child. In their view, a reader passes through stages of preparatory phase, whole word phase, grapheme-phoneme phase, sentence organisation phase and text organisation phase sequentially. At various stages the corresponding awareness having important roles are phonemic, lexical, syntactic and pragmatic awareness.

The different stages as hypothesised by Tunmer and Bowey (1984) overlap with each other and the progress is a gradual one. Acquisition of one subskill helps the child to move to the next stage. The stages of reading acquisition by Tunmer and Bowey (1984) are comparable with reading acquisition model by Frith(1985). The first stage i.e, the preparatory phase, is connected to the general awareness that the print is an encoded version of their spoken language. The next two stages of whole word learning and grapheme-phoneme correspondence are comparable to logographic and alphabetic stages of Frith's model. The last two stages in the model by Tunmer and Bowey (1984) specify organisation at sentence and text levels.

Further the model emphasises multiphasic feature of reading passing through decoding (i.e. phonemic and lexical) to meaning extraction (i.e. syntactic and pragmatic) subskills. The relative importance of various subskills varies at different levels of acquisition.
Here it may be said that the cognitive framework of Bialystok and Ryan (1985) suggests two important skills involved in solving metalinguistic problems. They are analysed knowledge and cognitive control. Various language tasks are assumed to presuppose differential levels of each of these skills. The linguistic tasks focussing on form increases the need for cognitive control while decrease in contextualisation as in metalinguistic tasks increases the need for analysed knowledge. Tasks like segmenting speech into syllables, words and into phonemes involve increased values of analysed knowledge (Vankleeck, 1982).

The model of Bialystok and Ryan (in press) proposes the process of learning to read in terms of three stages. The first stage relates to the knowledge of the function of reading, that is, the realisation that the print conveys meaning (Downing, 1979). The second involves knowledge of the features of reading (e.g., sound, letter, word) and control over that knowledge (Downing, 1979; Rozin & Gleitman, 1977) and the third developing control to coordinate attention to the formal features of language to extract meaning (Brown, 1980). Children with good reading experience progress through these stages almost simultaneously but poor readers may experience difficulty at any of these stages (Downing & Valtin, 1984). Once children are able to read and control, analysed knowledge play important roles quite differently in skilled and less skilled readers. Bialystock (1988) noticed a clear relation between aspects of linguistic awareness and reading comprehension.

Thus, metalinguistic awareness which involves an ability to
think and reflect upon language is crucial for reading acquisition. This awareness develops after the child begins formal schooling and thus can be said to be the result of learning to read (Donaldson, 1978). Besides metalinguistic awareness, the other important factors that govern reading acquisition in any language are verbal processing skill and reading awareness. These factors will be discussed separately in next section.

**Verbal Processing Skill**

Earlier discussion make it clear that reading skill involves one or more component processes of the child's language skill and several basic cognitive and perceptual resources must be mastered to effectively learn and integrate these component processes. Failure in reading may be due to deficits in one or more of the component processes of language skills and related cognitive resources. As reading is a highly complex activity, it has been difficult to determine the importance of each component processes in reading competence or in reading failure (Soto & Soto, 1983). Extensive literature on reading disability and dyslexia make it clear that deficiencies in wide range of verbal processing abilities are associated with reading problems. Vellutino (1978), reviewed the psychological factors in specific reading disability and concluded that verbal processing skills are associated with reading difficulty. According to Vellutino and other researchers (Blank & Bridger, 1966; Torgesen & Goldman, 1977 cited in Soto & Soto, 1983) differences between good and poor readers that have been attributed to visual and auditory memory and perception may
be better explained in terms of verbal processing. Such verbal processing abilities were also related to metalinguistic measures. As a separate discipline each has its own history of development, approaches and assumptions. This section will deal with the theories and researches on verbal processing skill and its relationship to reading.

**Verbal Processing skill of poor and good readers.** Some children and adults have abnormal difficulties in reading, although they are normal in emotional adjustment and have average IQ (Benton & Pearl, 1978). These are categorised as disabled or dyslexics. There is an impressive amount of evidence showing that groups of normal and disabled readers differ primarily in verbal skills. In the present section some of the research findings comparing the performance of poor and good readers will be highlighted.

Vellutino and Scanlon (1985) compared poor and normal readers from Grade 2 and 6 on free recall of concrete and abstract words. Poor readers were significantly deficient in linguistic coding than the normal readers. This suggests the hypothesis that deficiencies in verbal processing ability leads to developmental dyslexia.

The study of reading process has made it increasingly evident that the various components of language are of importance in skill reading (Kavanagh & Mattingly, 1972). Some of these stress the role of speech in reading (Downing, 1973; Elkonin, 1973, Liberman, Shankweiler & Mattingly, 1972; Savin, 1972), while others emphasise on the relationships between reading and the grammatical aspect of language (Goodman, 1965, 1968, Kolers, 1970; Smith, 1971, 1973). First group of theorists view reading
as a second order, language based skill. According to them, successful phonetic representation of symbols is necessary for subsequent interpretation of printed symbols. On the other hand, exponents of the second group conceptualise reading as "psycholinguistic" process which emphasise the role of semantic and syntactic cue systems.

Traditional views emphasised the role of vision in the acquisition of reading (Young & Lindsley, 1971). Gradually recent theories provided evidence for the fact that dyslexia is causally related to deficiencies in verbal rather than visual processing. Vellutino (1978) in his critical review examined four prevalent explanations of reading failure in children in forms of failure in visual perception, intersensory integration, temporal order perception and verbal functioning. Out of these four explanations, the verbal deficit hypothesis offers the most convincing explanation of reading failure. In reading, verbal information is not only necessary for sentence comprehension but also helps to develop different information contained in the printed word, viz, graphical (visual features), Orthographic (internal structure), phonologic (sound components), semantic (meaning) and syntactic (parts of speech). Lack of information in one of the linguistic constituents restricts the cues available for making accurate decoding. This process of transformation involves an efficient processing of graphic, phonological, semantic and syntactic information in written language (Soto & Soto, 1983). Now in the following section each of these aspects will be described.
**Graphic Information Processing.** Learning graphic features is very important in the development of reading skill. Children in the process of learning written symbols, naming letters and words come across many overlapping graphic features (e.g., was/saw, not/ton). They develop their own cues to read effectively. Many children confuse these look alikes may be due to their lack of information about one of the linguistic constituents. As a result, they fail to make clear distinction required for decoding. Poor readers commit more of directional and positional errors due to their confusion in the position and direction of letters. Thus, learning of the graphic features play an important role in reading acquisition.

**Semantic factors.** It has been argued in the literature that reading disability is associated with basic deficits in the ability to derive meaning from printed text (Goodman, 1969; Kolers, 1970; Smith, 1978). There is some support for this hypothesis. For example, poor readers have been found to be inferior to good readers on memory for words in a passage. Perfetti and Goldman (1976) in two separate experiments compared the poor and average readers on processing verbal information in short term memory. Two groups of children from third and fifth grades were selected on the basis of reading comprehension. Analysis of results revealed that the poor readers were comparable to average readers on memory for single digit directly following a probe digit. In the second experiment the poor readers failed to do well on memory for single words following a problem word, thus showing inferior memory for the group.

Another source of evidence is the poor readers inefficiency at
retaining specific words in a sentence recognition task (Waller, 1976). Analysis of false-recognition errors indicated that poor readers comprehended the overall meaning of sentences as well as the good readers, but are less effective in remembering the details of sentences. In addition, disabled readers were found to be slower and less accurate at generating names for common objects, colours, digits, letters and words presented visually. It can be said that the disabled readers had retrieval problems (Denckla & Rudela, 1976a, 1976b). All the above findings show that poor readers are deficient in both the storage and retrieval of printed and spoken words.

However, there is some direct evidence against the semantic deficit hypothesis. Studies demonstrated that disabled readers were as capable of using sentence context to facilitate word identification as the normal readers (Perfetti, Bell, Hogaboam & Goldman, 1975). This demonstrates the poor reader's capacity in processing the semantic context provided by the story. Some other evidence against the semantic deficit view is provided by Rozin, Poritsky and Sotsky (1971). In a symbol-word learning task, first graders who were poor in reading could learn the meanings of set of Chinese characters much more easily than they learned the meanings of the same words printed in standard English orthography. The above studies are quite contradictory and need further investigation.

**Syntactic factors.** Number of authors maintain that reading disability may result from deficiency in knowledge and application of complex grammatical relationships (Fry, Johnson &
Muehl, 1970; Vogel, 1974; Wiig et al; 1973). For example, Fry et al., (1970) compared normal and poor readers on story telling task. The normal readers proved to be more efficient in a number of linguistic tasks measuring verbal fluency, speaking vocabularies, organisational, integrative skills, abstract usage, grammar and complexity of sentence structure. Supportive evidences have been found by Vogel (1974) in a contrast study of average and dyslexic readers in a battery of tests measuring syntactic ability. In addition, Wiig, Semel and Crouse (1973) found the poor readers to be inferior to normal readers on a test of morphological usage. It can be argued that differential exposure to reading materials might have resulted in the difference in syntactic knowledge of the reader groups. The argument is based on the fact that most of the studies showing deficiencies in syntax include subjects with limited reading experience (Vellutino, 1979).

Despite the evidences supporting for syntactic deficiencies in poor readers, the theoretical relationship between syntactic difficulties and reading problems needs more studies. However, both the difficulties emerge at an early age and may have a common source (Vellutino, 1979).

**Phonological coding.** The most important process implicated by the linguistic deficit hypothesis is that reading difficulty in some children is due to deficiency in coding information into a phonetic form in short term memory (Liberman & Shankweiler, 1980; Liberman et al. 1977; Shankweiler, Liberman, Mark, Fowler & Fischer, 1979). In one of the earliest study, Wepman (1960, 1961) concluded that reading problems in certain children may be due to
deficiencies in auditory discrimination. Also poor readers were able to discriminate single words quite competently but could not do so well on pairs of words (Shankweiler & Liberman, 1979). One important observation was that so far as nonrhyming strings are concerned, good readers were found to be superior to poor readers whereas in case of rhyming strings, the performance of poor readers was not affected but was quite damaging to good readers. It may be that good readers were utilising a phonetic code and therefore the rhyming strings which are highly confusable phonetically were most disruptive to the good readers. In contrast as the poor readers do not rely as much on phonetic code are less troubled by rhyming.

One of the earliest classification of disabled readers that has been most influential over the past decade is that of Boder (1971, 1973). She proposed that the majority of disabled readers having difficulty in phonologically decoding words were known as "dysphonetic" and a smaller group having relatively good phonological skills with limited ability to recognise the visual gestalts of whole words were labeled as "dyseidetic". Two different reading styles were adopted due to deficit in visual and verbal cognitive resources. Consistent with this Boder (1973) hypothesised that the different reading styles were due to "phonic" and "sight-reading" approaches to teaching reading (Baron, 1979).

Studies point to the fact that phonemic segmentation is a complex skill and it takes time to develop. Results also state that the difficulty shown in phonemic segmentation at the
kindergarten level will be associated with difficulties latter in beginning reading (Liberman, Shankweiler, Fowler & Fischer, 1976). In a recent study, Haines and Leong (1983) found the less skilled readers to be less efficient in phonological coding.

Supporting evidences were given by Olson, Davidson, Kliege and Davis (1984). In their study poor readers were found to be less sensitive than normal readers to the phonetic characteristics of spoken and written words. Also training in phonetic structures significantly improved reading ability (Bradley & Bryant, 1983). Poor readers found difficulty in both phonemic segmentation and phonological coding skills. This can be due to dysfunction in visual-verbal integration.

In a number of studies, Vellutino and his associates argued that the fundamental problem for disabled readers lies in translating visual information into phonetic form. The reader groups demonstrated no difference on visual processing tasks but on verbal processing tasks normal readers outperformed the disabled readers.

Though a host of evidences differentiate reading ability in terms of the use of phonetic coding but the view that coding deficits in disabled readers are unique to verbal stimuli has been challenged. Studies have successfully differentiated good and poor readers with both verbal and nonverbal tasks (Cummings & Faw, 1976; Morrison et al., 1977; Noelkar & Schumsky, 1973; Spring & Capps, 1974; Stanley & Hall, 1973). However, phonetic coding cannot be claimed to be the sole factor of deficit in disabled readers. Equivalent performance differences were reported between the normal and disabled readers for letters,
geometric forms and abstract forms (Morrison et al., 1977). Hall et al., (1980) compared normal and disabled readers on rhyming and nonrhyming tasks. Both groups showed equal declines in recall score with rhyming words, thus indicating a lack of support for the phonetic coding deficiency hypothesis (Hall, Ewing, Tinzmann& Wilson, 1980).

In the review of various explanations of reading failure it is evident that problems in one or more aspects of language processing may result in the lack of effective storage and retrieval of information. The findings of Morrison et al., (1977) & Hall et al., (1980) support the view that normal and disabled readers differ in general encoding or memory skills. On the contrary Liberman et al., (1977) and Shankweiler et al., (1979) supported the specific phonetic coding deficit. It appears from the discussion that phonetic coding problems may be a part of more general pattern of performance problems. The other two factors, syntactic and semantic deficiencies contribute some extent to account for the majority of reading problems.

Good and poor readers were compared on several other aspects like strategies used in reading, rule learning, memory processes used. Golinkoff (1976) and Ryan (1979) noted that good and poor readers differed in their ability to provide strategies for improving comprehension and which again may be affected by various reading goals. Sometimes poor readers spend time on decoding individual words and thus skip the meaning of sentences (Smith, 1975). As a result due to lack of proper reading goals the poor readers fall behind the good readers.
Evidences suggest that disabled readers lag behind in various rules, for example grapheme-phoneme correspondence rules, rules about orthographic regularities (permissible combination of letters) and more abstract relational principles which depend on the position of letters in a word (Gibson & Levin, 1975; Venezky, 1970). Snowling (1980) provided evidence for the difficulty of disabled readers in grapheme-phoneme translation. Reading groups were observed differing in pronouncing words with complex rules. Disabled readers made more pronunciation errors on vowel units than on consonants (Shankweiler & Liberman, 1972). Vowels may be difficult due to the complexity of correspondence rules (e.g., a is pronounced differently in different words; cat, call, what). Most of the studies focus on the complexity of alphabetic system and more researches are needed for children learning to read Oriya.

Number of measures, for example, memory span tasks, semantic association task, associative learning test, automatic word processing tests are used to assess the verbal processing skill in children. In an Indian study, Sahoo (1986) compared the poor and normal reader's performance on a short term memory task involving a list of five pairs of word pseudoword list. The results showed a clear difference between achieving and nonachieving readers in rapid coding of verbal information showing thereby poor storage and retrieval.

In a task of verbal opposites, Johnson (1956) reported that the achieving readers were better in supplying verbal opposites than severely retarded readers. Consistent findings were obtained by Sahoo (1986) in Oriya speaking children. As the task focussed
on the use of word meanings as well as the semantic relations between words, the richer semantic information of the achieving readers helped in retrieving a word on the basis of a specific semantic dimension.

Few studies show a difference between good and poor readers in processing words automatically. This ability was measured by a picture-word task similar to the stroop task. The longer time taken to name pictures with superimposed conflicting words was considered an indication of automatic word processing or semantic interference. Some evidences were obtained in favour of good readers in a task involving processing semantic information of single words (Ehri, 1976; Pace & Golinkoff, 1976). However, some other researches failed to find any difference in automatic processing of highly familiar words between the reader groups (Golinkoff & Rosinski, 1976; Gutenberg & Haith, 1978). These findings prompted Stanovich (1980) to suggest that words are automatised much earlier in reading, most probably by the third grade it reaches the adult level. He further stated that after the attainment of automaticity, it is the word recognition speed rather than automaticity that shows itself in skill development. In an Indian study Sahoo (1986) could not find any difference between the achieving and nonachieving readers in the automatic word processing measure.

The reader's ability differences in the automatic responses to print are only found to be present for younger disabled and normal readers who are substantially different in reading skill. This suggests that young disabled readers are less automatic in
their processing of linguistic symbols which is not significant for older subjects (Golinkoff & Rosinsky, 1976). One of the most striking changes which occurs as children become more skilled at reading is that their processing of words becomes faster and this is due to transformation of a mental operation from being 'controlled' or nonautomatic to being automatic (Hasher & Zacks, 1979, Laberge, 1973; Laberge & Samuels, 1974; Schneider & Shiffrin, 1977).

From the analysis of the nature and acquisition of reading disability, it can be said to involve complex interactions among a number of skills. Morrison and Manis (1977) in their review specified the importance of three important tasks in the process of reading acquisition. First, the child has to master the rules of symbol-sound correspondences. Second, the child must learn the use of rules in learning words and must progressively refine and automate basic word-decoding operations. Third, the child must try to acquire a complex set of processing and comprehension skills for developing automated decoding processes. These three tasks are developmentally linked to one another. For example, sophisticated reading and comprehension skills depends on good word-decoding operations which in turn requires the mastery of symbol-sound correspondence rules. Deficiency at any level blocks the process of reading acquisition resulting in reading disability. Language is also complex system having irregular rules and requires the rapid automatic processing of linguistic input, memory and comprehension skills. Since reading is strongly dependent on language during the initial stages of acquisition, there is evidence of language problems in reading-disabled
children. Though clear deficits in the area of linguistic processing have been observed (e.g., Libermane et al., 1977; Shankweiler et al, 1979), coding problems of disabled readers have not been limited to the processing of verbal material (Morrison et al, 1977; Wolford & Fowler, 1984) alone.

Successful reading requires conscious knowledge about the purpose of reading and the various strategies to be adopted to attain the goal. Thus, reading awareness, another important factor in reading acquisition needs some attention at this point of our discussion.

Other Factors affecting Reading Development

Reading Awareness. The current view of the reading process explains reading as purposive and resides as much in the person reading as in the text to be read (Bransford & Johnson, 1972). The expectations of the reader, prior knowledge of language structure and content, its purpose constitutes good reading and are found to include ones process of reading. Reading awareness has been variously known as "reflective thinking", problem solving skills" and recently as "metacognition". The children's knowledge about reading is the metacognition skill (Paris & Jacobs, 1984). Researches have found that readers, including children, are aware of their knowledge and use strategies to attain their goals. The most important thing is that the reader can establish his or her own internal criteria for learning, monitor his or her own progress in terms of these criteria and act to satisfy his/her goals as a reader (Brown, Armbruster & Baker, 1986).
Paris and Jacobs (1984) view reading awareness to involve three dimensions—evaluation, planning, and regulation. Evaluation refers to appraisal of the task, planning to the procedural knowledge, i.e., knowing how (e.g., how to summarise a story). Regulation refers to monitoring of one's efforts in using various strategies to achieve various goals. These three aspects of reading awareness are important in reading acquisition and problem in one of these dimensions results in reading problem.

Gordon and Braun (1985) viewed metacomprehension as the awareness of one's level of understanding and the ability to control over cognitive actions during reading to facilitate comprehension of a text. The conscious attempts used by the active learner are various self-regulatory mechanisms as checking, planning, monitoring, testing, revising, and evaluating.

Several studies have tried to assess beginner's awareness of the purpose of reading. In one of the earliest studies in 1934, Vygotsky observed that school beginners in Russia had vague idea of the purposes of a written language. Reid (1966) found that children below 5 years of age did not know the goals of reading or the function of letters, words, or pronunciations. Downing (1970) also obtained similar findings on English children. Johns and Ellis (1976, cited in Johns, 1984) in one of the largest studies on student's perception on reading interviewed 1655 children from grade 1 to 8 regarding their views on reading. Analysis of the responses revealed that about 80% of the students over emphasised pronunciation aspect of reading at the cost of comprehension. Pattanayak (1981) in one of the Indian studies observed the primary school children often equated memorisation
of text with reading. Johns (1984) observed that second graders often perceived reading as "stand up" and "sit down" (referring to the instructions of the teacher). It is clear that children's awareness of the concept of reading is often overemphasised.

A portion of the research on metacognition has centered on individual differences among good and poor readers. According to Brown et al., (1986) young children find it difficult to identify central issues in complex prose. Good comprehenders make use of context in developing and understanding what they are reading, whereas poor readers do not. Canney and Winogard (1979) interviewed children of approximately 8, 10, 12 and 14 years of age with passages that were either intact or disrupted and asked if each passage could be read and why. Younger and poor readers emphasised the decoding aspects of reading whereas, good readers emphasised on making sense of the text as the goal of reading. In a comparison of good and poor readers matched on age, sex, Paris and Myers (1981) noticed that good readers showed more awareness of reading strategies, detected errors more often while reading and had better recall of text information. Forest and Waller (1979; cited in Paris & Jacobs, 1984) also observed that the older and good readers could verbalise more about their strategic knowledge and utilised that information while reading.

The reader's awareness and control over comprehension while reading is known as metacomprehension. This concerns the reader's ability to evaluate the ongoing processes while reading through a text and to take some sort of remedial measures wherever necessary. Mature readers often engage themselves in
comprehension monitoring, although seldom consciously. With failure in comprehension, the reader must allow extra processing to the problem area (Backer & Brown, 1984 b). Singer(1984) also noticed that mature readers are able to use various types of sub-skills more flexibly depending on the purpose of reading.

Thus, awareness of comprehension will yield better reading proficiency. It does not emerge naturally but needs some instructions. Russell(1970) viewed that "the dominant factor in comprehension is the purpose of the reader, stated or unstated". Schooling helps in making clear about purpose of reading by providing insights into the nature and various aspects of reading. In one intervention program, children were instructed about the reading strategies and were also encouraged to use these strategies. The experimental group scored significantly higher on the post-test measures including reading tasks and awareness of metacognitive skills of evaluating, planning and regulating reading comprehension. The results suggest the impact of children's understanding of the nature of reading activities on their reading behavior ( Cross, 1982; Jacobs, 1982; Lipson, 1982; cited in Downing & Valtin, 1984). Postman and Senders (1946) found that the reading comprehension of college students was significantly influenced by the purpose they were directed to adopt. Thus, task awareness trainings help in providing insights into the nature of reading which in turn help in better reading.

Awareness about reading develop with experience and proper training. It is necessary to make children aware of the purposes of reading from the earliest stages of schooling (Malonquist, 1978). In an Indian study Prakash and Mohanty (in press) reported
that reading awareness is related to reading skills. Reading awareness emerged as one of the best predictors of reading achievement at Grade 1 and 3 levels.

It is clear from analysis of researches that a reader's prior knowledge is a significant factor in his or her comprehension of a text. According to Anderson and Wilson (1986), a reader comprehends the intended message of a text when he is able to activate, or construct a schema that gives a good account of the objects and events described.

It can be concluded that as reading is strategic, it requires purposive and continuous monitoring of one's own comprehension in the process of skilled reading.

Some of the primary factors that affect reading performance like, metalinguistic awareness, verbal processing skill and reading awareness have already been discussed. It is necessary to discuss some other factors like teaching method and orthography which can be assumed to have a significant influence on the children's reading performance.

Teaching Method. Reading is a skill which does not emerge naturally in the course of development but it must be actively taught and systematically exercised. Children with same IQ level have different performances or success level which may be the result of different teaching methods. There are different methods available in Western literature. They are phonic, whole word, whole sentence methods (Pidgeon, 1984). Among these, phonic method and whole word methods are widely accepted by the researchers. In the phonic method, the child is first taught
sound values of different alphabets and only then is showed the word related to the alphabets. Thus, here the child through phonic recoding and auditory word recognition system tries to learn the print. After a number of readings, the child establishes a visual word recognition unit and thereafter recognises the object visually.

In contrast to phonic method, the "whole-word" or "look and say" method encourage recognition of words by sight (See Chall, 1967). Researchers have tried to compare the two teaching methods. Barr (1974) studied thirty-two 5 to 6 yr old nos. of children in their first year in school. These children were taught for three to eight months. Half of these children were taught by visual recognition method and the other half by phonic method. Analysis of the pattern of errors revealed the phonic readers committing more of nonword errors whereas sight-word readers produced no nonword error. Results also showed children taught by look and say or whole-word method may gradually take up their own phonic inferences based on their regular correspondences they encounter.

Different teaching methods will have different effects on the child's approach to reading. One of the greatest problem is that there is no pure whole-word or phonic method. There is family influence on how the child deals with the print. So it has been found children taught by phonic method may gradually take resort to whole-word method which may be due to overemphasis given for the method at home or the child had developed the skills of its own. Algeria, Pignot and Morais (1982) found the children taught by phonic methods to be better than children taught by whole
word methods at specific tasks like at reversing the phonemes of a one syllable, two phoneme word or nonword. This might be due to more attention required by phonic method to the sounds of language than do whole-word methods.

A study by Bradley and Bryant (1983) provided evidence for the positive effects that the teaching methods will have on the language awareness of children. A group of children with poor language awareness were trained vigorously for 2 years at selecting with a set of pictures having common objects with same names in beginning (e.g. hen, hat), middle (e.g. hen, pet) or final (e.g., hen, man) sounds. At the end of the training this group of children did much better than the group given no special training. This provides evidence for the fact that making young children aware of the sounds of their language will help them learn to read and write. Teaching methods also influence the rate of development of children. However, Indian studies are lacking as the teachers are less aware of methods used in teaching. They follow an intuitive free flowing method, as a result it creates less awareness among the students.

Orthography. Reading could be viewed as a specific aspect of general language behaviour and thus can be said to bear significant implications to the nature of an orthography. Various orthographies used in different societies arose as a gradual refinement of resources already available and served as conceptual building blocks required for further development. Orthography or the writing system is the functional distinctive unit of any writing system (French, 1976; Haas, 1976; Pulgram,
1976) known as grapheme. Writing systems differ in terms of the linguistic units they represent. The different hierarchy of units by which speech is represented are phonemes, syllables, morphemes, words, phrases and sentences. The first two are basically sound based units while the rest are meaning based units. Different writing systems choose different basic units. On the basis of units, present day writing systems can be classified as logographic, syllabary and alphabetic. Chinese language is a full logography or ideography as each character represent one idea or one morpheme, the smallest meaningful unit of a language. Japanese Kana is the syllabic system which represents language at the syllabic level, that is, each of its symbol represent one syllable. The first genuine alphabetic system is the Greek system and English is the best example of alphabetic system.

The different types of orthography involve different types of psychological processes and thus may require different cognitive strategies to achieve reading proficiency. In the process of reading acquisition, the reader takes help of the orthographic information. The ideographic chinese system represents meaning and thus is cognitively easier but its larger logographs put greater burden on memory. On the contrary the alphabetic system such as English is difficult because of its abstract phonemic units but it places a lower memory load (Glietman & Rozin, 1977). The chinese writing system which marks morphemes but not words inhibit reading (Taylor, 1979). The alphabetic writing induces more analytic phonemic awareness which might have important psychological influence on the reader. Indian orthographic system is a mixture of syllabic and
alphabetic principles in which the alphabetic segments are combined to form syllabic units and each syllable form can be analysed into its consonant and vowel components. Initially the syllabary system may pose problems because of the multiplicity of symbols, but once all the symbols are learnt, the nearly perfect grapho-phoneme correspondence makes oral reading easier. The origin of all Indian languages that is Brahmi script consists of syllables formed by systematic arrangement of vowels and consonants. Thus, various structural features of language put differential constraints on reading and literacy practice.

The alphabetic script puts the heaviest demand, ideographic the least and the syllabary puts an optimal level of demand (Mattingly, 1984). Different writing system vary with regard to the role of phonemic segmentation in reading. Research evidences suggest that phonemic segmentation skill develop under alphabetic literacy, but not necessarily otherwise (Bertelson, 1986; Rekha, 1987).

The semi-syllabic orthographic context provides another plane to study the cognitive consequences of literacy acquisition in relation to the type of orthography. Oriya, one of the officially recognised Indian languages is an alphabetic-syllabic type of phonetic orthography. Like an alphabetic orthography it consists of 46 alphabets and like a syllabic orthography each alphabet is a syllable that is independently pronounceable. Out of the 46 letters, there are 12 vowels and 34 consonants. The vowels could be symbolically presented known as "matras". Some consonants could also be symbolically represented called as
"phalas". Oriya orthography also provides for combinations of different consonants known as "yuktakshyaras" which means compound or conjunct consonants (Padhi, 1971; Praharaj, 1936).

Besides, Oriya orthography is a phonetic orthography in which each letter has a unique phonetic representation that remains constant across all types of letter usage. These aspects of Oriya orthography would have significant implications for reading (Sahoo, 1988). Some other Indian studies involving Kannada uniliterates, Kannada-English biliterates, Hindi literates-illiterates, a possible position effect and mental representations of structural features of orthography was found out (Prakash, Karanth, Rekha & Nigam, 1993).

It is also well known from evidence that reading disability in one orthography does not necessarily mean inability to read other types of scripts. The incidence of dyslexia across various scripts is not the same. Dyslexic cases are common in French/English speaking countries whereas it is rare in Japan. Sahoo (1986) also found consistent findings in Indian context stating that reading disability in one orthography may not lead to inability to read other types of scripts e.g. American dyslexics could be taught ideographic reading (Wang, 1981).

To summarise, the various factors that affect reading acquisition can be grouped under two broad types--i.e. external factors (teaching method, type of orthography, reading awareness) and internal factors (STM, IQ). Teaching method and reading awareness factors influence the comprehension aspect of reading and are externally controlled. Type of orthography used by a particular society will determine the literacy level and
incidence of problem readers. Researches also show that repeated visual contact with the orthographic structure along with supportive corrective feed back develops an internal representation of word structure which latter facilitates reading process (cited in Sahoo, 1988).

**Major Trends in the Literature**

The review of literature in the previous section on reading acquisition, metalinguistic awareness and verbal processing factors highlight the possible relationship of these factors. Reading is a complex language based skill which involves mastering the structural and functional properties/rules of the writing system. As a matter of fact metalinguistic awareness is found to be related to the reading skill development.

The model of Tunmer and Bowey (1984) describes the different aspects of metalinguistic awareness as phonological, lexical, syntactic and pragmatic. All these levels of awareness are important at different stages of reading acquisition. At the initial or decoding stage of reading, phonemic and lexical awareness play important role and for comprehension, the skills at syntactic and pragmatic levels are important. The findings by Prakash (1987) support the above assumption. In a latter study Rout (1994) could not find any single level as having special significance for literacy acquisition.

Western studies emphasise the fact that phonological awareness plays a critical role in early phase of reading. Doctor and Colthart (1980) and Singer (1984) provided evidence for the fact that recognition of words are mediated through phonological
Many other studies like Bradley and Bryant (1983, 1985) and Share, Jorm, Maclean and Mathews (1984) established the fact that early sound categorisation ability is the best predictor of reading achievement. Recent studies also suggest that familiarity with nursery rhymes enhances children's sensitivity to the component sounds in their language and this in turn affects their progress in reading (Bradley, Bryant, Maclean & Crossland 1988).

However, Indian studies differ in the importance given to phonological skill in the process of reading acquisition. For example, in a study by Prakash et al, (1993) on literacy and phonological awareness in Kannada and Hindi speaking literates and illiterate adults and in children from grades 1-3 showed that in spite of poor performance in phoneme tasks they performed above average level in reading. The effect of phoneme awareness in learning to read Oriya was not found to be significant (Prakash, 1987). Consistent findings were obtained by Rout (1994) on children (Grades 1, 3 and 5). It can thus be said that phoneme awareness is linked not to literacy in general but to alphabetic literacy in particular.

Further, the different models suggest the sequence of steps involved in reading. Among the various models discussed, Frith's (1985) stage model of literacy acquisition is widely accepted. The first stage is the logoraphic stage in which the child recognises the familiar words on the basis of graphic features. In the second stage that is alphabetic stage, grapheme-phoneme correspondence rules are used in reading. The third stage is the orthographic stage in which a direct visual access is
reestablished without phonological conversion. They are the 
sight-vocabulary stage, analytic stage and the synthetic stage. 
Arrest in any of these stages might result in developmental 
disorder.

As already noted, the developmental sequence of stages in the 
reading acquisition models of Marsh and colleagues and Frith are 
presented as a natural one which suggest that logographic 
reading should occur universally when children of a certain age 
range learn to read and write an alphabetic script. It mainly 
reflects the teaching approach in which American and British 
children are taught to read and write. Initially a "whole word" 
(look and say) approach is followed and then it changes to a 
"phonic" regime. It seems possible that the poor fit between 
sound and graphemic representation at the beginning of reading 
may exert some pressure towards a logographic strategy. This 
irregularity between written words results in unsuccessful 
reading in the adoption of a simple alphabetic strategy. However, if the logographic stage constitutes a natural and 
universal first step at the beginning of reading because of 
children's deficient phonemic awareness or because of 
preoperational thought, then, even in the phonologically 
transparent writing system, reading should begin with a 
logographic stage.

Recent findings by Wimmer and Hummer (1990) casts some doubts 
on assumptions invoked by Marsh and Colleagues (1981) and by 
Frith (1985) to explain the naturalness of the logographic stage 
and the late emergence of alphabetic processes. As already noted,
Marsh and Colleagues (1981) assumed that the preoperational thinking prevent the acquisition of an alphabetic strategy up to age 7. The study by Wimmer et al., (1990) involving German-speaking first graders (7 year old) showed a lack of phonemic awareness as measured by a phoneme substitution task. In spite of this, most children acquired an alphabetic strategy without difficulty as shown by their successful reading and spelling of pseudowords. It may be due to the phonemic transparency of the German writing system. It was further suggested that the use of phonics would be more effective with 7 year olds than with 4 to 5 year olds provided the orthography is transparent. Thus, for German-speaking children, logographic stage appears to be of less importance where a limited number of words are read logographically and logographic reading is not practiced for a long period.

Similar observations were reported by Prakash (1987) that Oriya children could read well despite poor phonological skill. Some later studies also pointed out that there were children who showed good oral reading with poor comprehension in reading Oriya (Mohanty & Rout, 1992; Prakash & Mohanty, 1989). The transparency of Oriya Orthography and the rote method of teaching may be responsible for good oral reading and poor comprehension contrary to what would be predicted on the basis of western findings.

Hence, it can be concluded from the above findings that the developmental sequence from the logographic to alphabetic sequence varies with the nature of orthography. Also the phonemic transparency of certain writing systems like, German, Oriya, allows direct teaching of all relevant grapheme-phoneme
correspondences and makes sounding out a successful word identification strategy without phonological skill and comprehension.

A different approach is that of verbal processing approach which tries to explain to some extent the problems of reading failure. It was viewed that poor readers are slow in processing written materials indicating a visual-perceptual deficit. Vellutino (1979) suggested that reading disability may be attributable to failure in one or more aspects of linguistic functioning, i.e. semantic, syntactic, phonological factors. Liberman and her associates (1979) described the difficulties of the low achievers to failure to apprehend and generalise the separate sounds in spoken and printed words and therefore have difficulty in establishing proper grapheme-phoneme correspondences. Sophisticated reading and comprehension skills depend on good automated word-decoding operations which in turn require the mastery of symbol-sound correspondence rules (Morrison & Manis, 1977). Deficiency at any level blocks the process of reading acquisition resulting in reading disability. Reading thus being a language based skill, any disorder in one or more aspects of language may lead to problems in reading.

On the whole, it appears that several factors like poor information processing and integration skills, poor verbal processing skills and poor metalinguistic skills, particularly phonological awareness result in reading failure. However, review of literature shows the importance of phonological awareness may be specific to certain writing system (such as alphabetic system).
and no others. From various research observations it appears that reading disability in one orthography does not necessarily mean inability to read other types of scripts (Rozin, 1971; cited in Karanth, 1992) & Spector (1980; cited in Obler, 1983). Thus, orthography specific factors in reading need to be examined by cross orthography data. Further, most of the studies on reading development are limited to cross-sectional samples. The exact course of development and consistency across grades can be better determined by longitudinal studies.

Thus, the present longitudinal study on Oriya-speaking children was planned to find out (i) the course of development in respect of reading awareness, metalinguistic awareness and verbal processing skill over the grades, (ii) the relationship between development of reading and metalinguistic skills as well as verbal processing skills in view of the nature of Oriya orthography, (iii) the nature of relationship among various measures of reading, metalinguistic awareness and verbal processing skill, and (iv) to compare the performance of good and poor readers on various measures over the grades.