THE ORTHOGRAPHIC FACTOR IN PHONOLOGICAL AWARENESS WITH RELATION TO READING

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DISSERTATION SUBMITTED TO THE UNIVERSITY OF MYSORE AS A PART FULFILMENT FOR FINAL YEAR M.SC. (SPEECH AND HEARING).

ALL INDIA INSTITUTE OF SPEECH AND HEARING: MYSORE 570 006.

1992

My dearest Papa for
teaching me life's
most important lesson
of
C O N T E N T M E N T

Dear mummy, my love
& my strength
for moulding me
into what I am to-day.

CERTIFICATE

This is to certify that the Dissertation entitled: THE ORTHOGRAPHIC FACTOR IN PHONOLOGICAL AWARENESS WITH RELATION TO READING has been prepared under my supervision and guidance.

Mysore Dr.Prathibha Karanth
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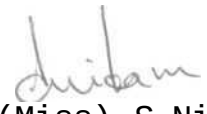

Dr.(Miss) S.Nikam,
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All India Institute of
Speech & Hearing.

Mysore
1992

D E C L A R A T I O N

This Dissertation entitled: THE ORTHOGRAPHIC FACTOR IN PHONOLOGICAL AWARENESS WITH RELATION TO READING is the result of my own study undertaken under the guidance of Dr.Prathibha Karanth, HOD. Dept. of Speech Pathology, All India Institute of Speech and Hearing, Mysore and has not been submitted earlier at any University for any other Diploma or Degree.

Mysore
1992

Reg.No.M9009

ACKNOWLEDGEMENTS

I extend my deepest gratitude to my guide, my idol Dr.Prathibha Karanth, HOD, Speech Pathology, AIISH, Mysore for her loving and patient listening and teaching.

I also thank Dr.(Miss) S.Nikam, Director, AIISH, for allowing me to take-up this study.

- Thanks to my sources of interest and inspiration in this field.

  - My three little cutie pies - Falu, Tejas and Amit

  - Mani Rao madam, HOD.Speech Pathology, AYJNIHH, Bombay for opening the doors of "Reading Research".

  - Dear Meenal and Shilpa for joint endeavour in III B.Sc.

I would like to extend my heartfelt thanks to Miss Rekha , and Mrs.Vasantha; and Mrs. Suchitra, Clinical Assistant, Dr.R.S.Shukla, Lecturer in Speech Pathology, Mr.Venkatesh, C.S., Lecturer in Speech Science, and Mr.B.N.Krishnamurthy, Research Officer for their timely help.

My thanks are also due to

- Library staff for their ever-ready helping hand.

- Principals and teachers of the following schools:

  Sir J.J.Princess Street Primary School, Bombay.

  The Kalbadevi Gujarati School, Bombay

  for their help and co-operation.

- Sweet little tiny tots - the subjects of my study.

- Dr.P.S.Vidyasagar, Lecturer in Clinical Psychology, Mr.Jayaram, Reader in Statistics, CIIL, and Mr.Mewa Singh, Dept. of Psychology, University of Mysore to help me find meaning in the numerals.

To my cherished friends -

Thanks dear Nandu for all "Friday Special" evenings and joy you brought to each day by your love and understanding
CARING AND SHARING
to top it up with
LAUGHTER THROUGH TOUGHTIMES

Dear Jyoti, thanks for being there for me time and time again and brightening up my cloudy days.

Thank you Rashmi, to teach me "Smile and World will smile back to you". It has helped me and I'm sure it will help in future too.

Thanks Hari, for your understanding and supportive friendship.

Shipra, Sai, Jeny for help,for hugs and kisses,and for boosting up my confidence when I needed these the most.

To all my classmates to make this year a memorable one.

Dear Anitha thanks for timely help and Priya for passing on your bubbling enthusiasm to me.

Thank you dear brothers, bhabhis and sisters and jijajis for tying ribbons of happiness around all my days and for helping me find meaning in each of them.

Thanks to all who have helped me directly or indirectly in completing this work.

Thank you will not do for you 'akka' but I've no other way to express my feelings.

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INTRODUCTION

"Reading is man's most potent skill. Without reading, his world is circumscribed by his neighbours. All he learns is what he picks up in conversation, information garbled in its transmission, delayed by the slow seepage of news through word of mouth".

W.W.Charters (1941).

Education depends primarily on communication through spoken or written words. Early in history, education depended largely on verbal communication, but since the invention of the printing press the written word has become a requisite to practically all phases of education. Reading the printed word enables us to enjoy many of the good things of life, to communicate with each other and to share experiences of others through recorded history, scientific records, stories, plays and poetry. Written words may be a source of joy and inspiration just as a painted picture or the score of a symphony may be.

The process of reading involves the capacity to perceive, to recognize symbols and to integrate them into meaningful sequences. It involves some capacity for abstract reasoning. Any person who has some dysfunction or developmental lag in reading, emotional block in learning or is "just a slow reader" is handicapped regardless of his endowment of general

intelligence of his abilities in other fields. In the race of life and with the concept of survival of the fittest, the acquisition of skill in reading has became a dire necessity. Reading is so fundamental that it cannot be bypassed, without tremendous loss in terms of education and consequently in terms of a job for a livelihood.

Scientific attitudes toward the problem of failure to learn to read have oscillated like a pendulum over the past century. The first reports with children with inexplicable difficulties spoke of an underlying derangement of visual memory and proposed the descriptive term "congenital word blindness" (Pringle Morgan, 1896? Hinshelwood, 1895, 1917). In the early part of this century, it was considered to be because of structural brain damage by Fisher (1910). However, Apart (1924) and Pötzl (1924) visualized a developmental delay of functional rather than anatomical nature. Thus there gradually arose the conception of a maturational lag to explain the dyslexia. There has also been a long standing debate on the contribution of uncertain cerebral dominance to reading disorders, a concept of direct relevance because of hemispheric specialization for language. The origin of this concept goes back to Orton (1937) who explained that interferences between oppositely oriented engrams in the two hemispheres could be the cause for the disabled

reader's proneness to mistake some letters for their mirror images(eg, b for d, p for q). Hollingworth (1925) in her paper on,"The psychology of special disability in spelling" favoured environmental and emotional problems rather than an innate lack of spelling endowment. Because of so many views coming forth, delayed or diminished powers of learning to read were then considered as not clear cut entity but as a non-specific resultant brought about by a diversity of factors. This multifactorial notion reached its peak When Robinson (1946) listed some 12 causes of varities of reading failure. According to Hermann (1959) reading problems were caused by deficits in visual perceptual processes. However this view began to desipate in 1970s as reading specialists became dissatisfied with perceptually based reading theories and programs. This paved way to views that focussed the linguistic and cognitive basis of reading. Researchers in the 1970s began to explore more fully the role of cognitive processes other than visual ones for reading (Gibson and Levin, 1975? Stanovich, 1982 a, by Vellutino, 1979). These researchers examined factors such as attention and memory as well as the linguistic processes involved in reading.

Credit goes to Elkonin (1963, 1973) for his proposition that the basis of successful reading of an alphabetic writing

system is the analysis of the sound formation of words, no matter how the written word is perceived visually. Before learning to read, a child should be able to discriminate auditorily between the basic sound units of language (phonemes). Authorities in reading (Gibson and Levin, 1975; Kavanaugh and Mattingly, 1972; Smith, 1971) and speech-language pathology (Rees, 1974; Stark, 1975) now agree that reading is a language based skill. Shankweiler and Liberman (1976) point out that reading problems may result from a defective appreciation of phonetic structure of language, this failure occuring at a relatively higher level of linguistic processing. In contrast, a more basic impairment of auditory discrimination of spoken sounds has been proposed by Wepman (1961) This has been criticised by Vellutino (1979), who has suggested that poor readers may be able to identify similar words presented as whole and yet be less aware of their phonetic structure than normal readers.

Thus knowledge of the language being read is at the heart of the reading process, and without that knowledge, reading could simply not take place. This knowledge of language can be divided into 3 parts - Knowledge of the sounds of the language (ie. its phonology), knowledge of the words of the language (ie. its lexicon) and Knowledge of the sentences of the language (its syntax and semantics). Each of these play an important role in learning to read and each

is crucially involved in the process of reading by the skilled reader. Of the three, role of phonology has been extensively studied and has consistently shown relation to reading in alphabetic writing system. However, this evidence of phonological awareness and its relation to reading mainly comes from studies done on English speaking children , Although data from other languages have been obtained explicit cross language comparisions made are limited. At this point, it is logical to think that since languages vary in their phonological structures, they may also vary in terms of the demands they make on the beginning readers.

Indian orthographic systems, being quite different from English (alphabetic) orthography, provides a new direction and a plane for comparative and contrastive studies for probing the orthography-reading issue.

Thus the present study was undertaken with the aim of comparing the importance of phonological awareness across two groups of children - one exposed to an alphabetic orthography (English) and other to a syllabo-alphabetic or semi-syllabic orthography(Gujarati).

An alphabetic writing system represents speech at the morphophonemic level such that grapheme - sound - meaning relation is more or less opaque, requiring a more analytical

processing strategy to unpack the meaning encoded in words which are composed of a further reduced set of symbols. The abstractness of such a multi-level representation may be optimum for fluent readers (Chomsky and Halle, 1968), but it poses a great deal of difficulty for those beginning readers whose cognitive ability has not achieved the level necessary for extracting the phonological regularities embedded in the written words.

Gujarati which falls into Devanagari writing system is a syllabo-alphabetic or semi-syllabic orthography (Cohen, 1958; Miller, 1967 and Jensen, 1970). All the vocalic and consonantal phonemes have graphemic counter parts. The alphabetic segments are combined to form syllable units which are spatially delimited. In this process the shapes of the vocalic graphemes change in non-initial position. The vowel schwa has no independent form, it is implicitly present in consonantal graphemes, unless otherwise indicated with a diacritic. As for the spatial position for the rest of the vocalic graphemes, there are different designated locations around the consonantal graphemes. In written syllabic configurations, the consonantal grapheme remains central, while the vocalic graphemes are placed right above and below. Further description of this orthography has been given by Patel and Soper (1987).

The diversity of writing systems provides excellent opportunities for investigators to examine how children of different languages adjust themselves to meet various task demands imposed by different orthographies. Since Devanagari delimits syllables by organizing the phonemic graphemic features into spatial configurations (not sequentially, as letters are arranged in an alphabetic writing), one would expect children to find it easy to respond to the articulatory orthographic syllabic patterns and grow into reading as a part of their psycholinguistic development. The acquisition of Devanagari at least initially seems to be more direct, in that intraword structure in terms of syllabographs is made available. Hence it is reasonable to assume that these differences in orthographieshas a differential effect on phonological awareness and reading.

Hence the present study was aimed at the following in Gujarati which has a semisyllabic script as against English which has an alphabetic script.

i) To see if orthography was a factor related to speech segmentation ability and if it had differential effect on the different levels of speech segmentation.

ii) To see if the ability of speech segmentation was different amongst the good and poor readers of both the groups (alphabetic and semi-syllabic script readers).

iii) To find if there was a high correlation between word reading and speech segmentation tasks across different orthographies.

To meet these aims the following hypotheses were formulated.

HYPOTHESIS(I)(A): There is a significant difference in performance of English and Gujarati medium children on speech segmentation task (combined) for each of the three classes tested.

(I)(B): There is significant difference in performance of English and Gujarati medium children on

(i) Khyme recognition

(ii) Syllable stripping

(iii) Phoneme stripping

for each of the three classes tested.

HYPOTHESIS II: There is a significant difference between good and poor readers' performance on speech segmentation tasks in both English and Gujarati medium children.

HYPOTHESIS (III)(A): There is a high correlation between word reading and speech segmentation ability for English medium children.

III(B): There is a high correlation between word reading and speech segmentation ability for Gujarati medium children.

REVIEW OF LITERATURE

Reading is a secondary linguistic skill which builds upon spoken language. Knowledge of the language being read is at the heart of reading process without which reading could simply not take place. Authorities in reading (Smith, 1971; Kavanaugh and Mattingly, 1972; Gibson, and Levin, 1975) and speech-language pathology (Rees, 1974; Stark, 1975) agree that reading is a language based skill. Some children perform this task of reading quite adeptly while others encounter much difficulty. It has become a question of both scientific and practical merit, why there exists such a range of success in learning to read.

We learn to read fluently because we are able to speak and listen with awareness (Cooper, 1972) and have the linguistic and cognitive potential to grasp the structure of complex discourse (Prefetti and Goldman, 1976). Research effort of Haskins reading research group has led to the conviction that the difficulty of most though not all children who have problems in learning to read is basically linguistic in nature not visual or auditory or motor (Liberman and Mann, 1981).

Language based theories of reading disorders have received both practical and empirical support. Studies

of reading disordered children often have found deficits in these children's oral language. These deficits have included poorly developed vocabularies (Fry et al. 1970), deficiencies in the use of morphology or syntax (Fletcher, et al. 1981), and difficulties in comprehension of syntactic structures (Byrne, 1981; Fletcher, et al.1981). They also have other less apparent language deficits. One prominent theory proposes a deficit in phonological system (Frith, 1981; Liberman, 1983; Torgesen, 1985). Other research indicates that many reading disordered children have deficits in the verbal short term memory (Cohen, 1982; Jorm, 1983; Torgesen, 1985; Bradly, 1986). No deficits have been found in non-verbal short-term memory (Torgesen's 1985 review). Shankweiler and Crain (1986) have extensively reviewed the literature and have listed the following areas of deficit.

(i) Difficulties in naming objects (Denckla and Rudel, 1976; Wolf, 1981).

(ii) Deficiencies in verbal working memory (Liberman, 1977).

(iii) Poor conscious access to sublexical segmentation and poorly developed metalinguistic abilities for manipulation of segments (Morals, 1979; Liberman and Shankweiler, 1985).

(iv) Special limitations in phonetic perception.

(v) Difficulties in understanding spoken sentences.

It has also been observed that children with history of speech and language impairment experience difficulties learning to read (Maxwell and Wallach, 1984; Weiner, 1985).

Naslund (1990) in a sample of 169 German preschoolers tested their general verbal ability, verbal memory span phonological awareness, lexical access, speed and accuracy and letter knowledge. These tests were used as independent measures predicting performance on second grade reading comprehension. Word discrimination and word decoding speech. Tests of verbal ability memory capacity and phonological awareness were also given over a year later in elementary school. The analysis of their results revealed a differential main effects and interactions for the three dependent measures. A significant three way interaction among lexical access, memory capacity and phonological awareness was found for all reading measures. These results indicate that the interaction and subsequent effects of these linguistic skills precedes and influences reading acquisition.

Let us now focus on role of phonology in reading. Recognition of a word presented in the visual modality is ultimately based upon a match between a printed string of letters and a lexical representation. There are many questions on this issue as we go further. Is phonological information made available routinely in visual lexical access? Is

phonological information generated pre-lexically or post-lexically? If phonological information mediates visual access to a word's representation, is the mediation obligatory or optional? To understand these we first need to look at the ways in which early readers accomplish the task. It has long been accepted that they might be doing so in one of the two ways. One that is based on some abstract representation of the orthography which depends on the previously learned information about specific words. The printed letter string is used to access an entry in developing mental lexicon and a specification of the wordspronounciation is retrieved. This is also known as lexical route. A second possibility is that a non-lexical or rule based procedure is used in which a learned system of rules relates particular letter groups to particular spoken sounds, a system of rules converts a letter sequence to a sound sequence which the reader than utters.

The relative use of lexical and phonetic codes is determined by factors such as subject's reading ability, the complexity of stimuli, and task demands. For example the lexical route gains priority when the subjects are fluent readers, when the stimuli are very familiar or phonemically irregular, and when the task emphasizes graphemic aspects of the printed words. In contrast phonological codes are employed relatively more by unexperienced readers

when the stimuli are more complex and when phonemic aspects of the material are emphasized by the task. (McCusker, Hinger and Bias, 1981).

Bradley and Bryant (1983) suggest that it is the non-lexical procedure which is the important one at first, that the child must attain competence in analysing spoken English words into their constituent sounds before beginning to learn to read using the non-lexical procedure, that children can be trained to attain such competence before they are old enough to be taught to read and such training helps children learn to read. Thus phonological awareness which refers to awareness of sound structure of language has been proven to be a crucial precursor of later reading ability (Bryant and Bradley, 1985). As early as 1962, Gibson et al. have stressed the usefulness of grapheme - phoneme - conver-tion in facilitating reading.

Liberman, Cooper et al (1967) commented that learning to read must surely benefit from the correspondence rules with speech, since any rule system reduces enormously the amount that has to be learned. But it is also important not to oversimplify the nature of such relationship. Coding, combination rules and underlying invariant properties must be considered.

Elkonin, 1963, 1973; Mattingly, 1972; Shankweiler and Liberman, 1972, 1976; Liberman et al. 1971, 1980, have explained the necessity of phonological awareness by stressing that the reading process is dependent on the ability to analyse the sound structure of spoken words into their component units (phonemes) and to blend these units in creating the sounds of syllables as the basic units of reading. On the other hand, Turner and Fletcher (1981) commented that the child's fundamental task in learning to read is to discover how to map the printed text onto his existing language, a task which requires the ability to deal explicitly with the structural features of the spoken language. The metalinguistic ability to reflect upon language, therefore, should be an important pre-requisite for being able to discover the properties of spoken language that are central to the correspondences between its written form. They found no direct relationship between phonological awareness and reading ability. They found that phonological awareness was necessary but not a sufficient condition for being able to read synthetic words. Phonological awareness is a prerequisite for being able to learn grapheme-phoneme conversion rules, the knowledge of which is strongly related to reading ability.

Mann and Brady (1988) are of the view that learning a relatively small number of characters of an alphabet along

with a set of grapheme-phoneme conversion rules allows readers to read not only highly familiar words but even the words previously not encountered.

Goswami (1990) suggested that improving child's phonological awareness helps them learn analogies and use them in reading and spelling. The importance of learning such analogies lies in the fact a child who uses such analogies can bypass many of the problems encountered when new words are read via letter sound rules.

Considerable research has been aimed at children's ability to segment speech. Inability to segment appears to be strongly corelated to poor reading performance (Savin, 1972; Helfgott, 1976; Liberman et al. 1977; Resin and Gleitman, 1977; Blachman, 1980; Mann, 1981; Shankweiler and Crain, 1986). Rosin and Gleitman (1977) put it affirmatively as "our belief is that the stumbling block is access to phonology, while the young child can focus on and manipulate linguistic meaning, he does not realize that his speech is literally composed of sequences of sounds. Examples of such segmentation tasks which determine children's phonological awareness include syllable and phoneme counting games (Liberman, et al. 1973, 1977; Tunmer and Nesdale, 1985), detection of rhyme (Gough, 1972; Bradley and Bryant, 1978; Goswami, 1990), and phoneme or syllable stripping (Morais et al. 1984; Mann, 1986b).

Liberman et al (1974) have found that in a sample of four, five and six year olds, none of the nursery age children could segment phoneme where as half managed to do syllable segmentation. Only 17% of kindergartners could segment by phoneme, while again about half could segment by syllable. At six, 90% of the children could do syllable segmentation, only 70% were successful with phonemic segmentation. Thus a spurt of phoneme segmentation has been reported at age six. It is evident also that awareness of phoneme segments is harder to achieve as compared to awareness of syllable segments. The authors reason this out by saying that phonemes being abstract units of speech stream cannot be generally produced in isolation.

Rosner (1979) included a 13 item test which required deletion of initial medial and final sounds first at the syllable level (eg. say picnic,now say without nic) and then at the phoneme level (eg. say coat, now say without c). They found the good readers scored slightly higher on this test.

Kamhi et al (1985) compared metalinguistic awareness of normals and language impaired children by giving them tasks of dividing sentences, bisyllabic words and monosyllabic words into smaller units. Their results indicated that the language impaired children performed significantly

poorer than the normal children and they concluded that this deficit places them significantly at risk for future academic difficulties, in particular, learning to read.

Kamhi and Catts (1986) studied three groups of children normals,language impaired and reading impaired by employing four measures of phonological awareness, several measures of word and sentence repetition abilities. Findings supported the earlier claims made that children with reading impairments have difficulty processing phonological information. In addition they found that the language impaired group performed significantly worse than reading impaired children only on those measures involving word and sentence repetition. These findings raise questions about distinctiveness of school age children with history of language impairment and poor readers with no history of language impairment.

Shriberg and Kwaitkowski (1988) conducted a longitudinal study of 36 children who received preschool service at phonology clinic. They found that these children continued to have speech language and special educational needs as they neared middle school and beyond, many of whom also required special class placements.

Seigel and Faux (1989) studied correspondence rules uring both words and pseudo words (designed to contain some

features as real words). They studied 76 normal and 32 reading impaired children between age 6-14 years and showed that reading disabled children had significant difficulty in abstracting the basic rules for grapheme-phoneme correspondence in English and even when they had mastered these rules in connection with real words. They still had difficulty applying these rules to pseudowords. In normal development, the learning of these correspondences appear to be consolidated by approximately 9 years of age. However, reading disabled children appear to have a significant and persistent problem with learning of basic rules.

Savin (1972) is of the view that everyone who has filed to read even the simplest prose by the end of the first grade has been unable to analyse syllables into phonemes as shown by the following observations.

(1) They are insensitive to rhymes.

(ii) They are unable to learn pig Latin which requires one to modify English and shifting the initial consonant cluster (Part of a syllable) of each word to the end of the word and then add the sound'ey'.

(iii) They are unable to analyse syllables into phonemes, however, are able to segment speech.

Liberman et al (1977) showed that their poor readers showed no evidence of phonetic recording. While the success with which such phonological recoding can be achieved depends upon how uniform the correspondences are between

letters and sounds, there is a further difficulty even for languages where these correspondences apply without exception. Because some phonemes cannot be pronounced in isolation, the names of some letters must differ from the sounds which correspond to them. Thus letter names differ from letter sounds. It is the letter names which are learned, but it is the letter sounds which are needed for the process of grapheme phoneme conversion. Russel (1982) found that there was an impairment of phonetic processes in dyslexic children which could not be ascribed simply to a peripheral defect of hearing.

Dodd et al (1989) studied a group of 11-12 year old children identified as poor spellers. By testing real and nonsense word spelling and reading, segmentation of speech and syllables, rhyme judgement and imitation of polysyllabic words, the authors found that these spelling disordered children had a general difficulty in processing phonological information. Reading, spelling and speaking performance deteriorated when phonological complexity increased.

Apart from these studies, other additional evidences come from the studies done on illiterate adults of different language backgrounds. The failure of adults to perform phoneme segmentation was first demonstrated with speakers

of Portuguese (Morals et al. 1979). Similar findings have been reported in speakers of French (Algeria et al.1982), serbo-creatian (Ognjenovie et al. 1983), Spanish speaking (deMoiurique and Granigue, 1984), Chinese logogram readers who were unacquainted with the alphabet (Read et al. 1984), Swedish (Olofsson, 1985). Roughly the same results have been obtained in the U.S. with English speaking semiliterate adults (Liberman et al. 1985).

Ravi Nigam(1988) examined the effect of literacy an speech segmentation tasks. Speech segmentation ability among literates and illiterates was studied through different segmentation tasks.

The results of his study showed that illiterates perform poorly on phoneme oddity-syllable stripping and phoneme stripping as compared to literate subjects. However, no significant difference between literateand illiterates was found in the task of recognizing rhyme.

Performance on syllable stripping was found to be better in both the groups.

The author concluded that syllable manipulation can be developed without any specific reading instruction where as it can be further developed by specific reading instruction, whereas phonemic awareness requires instruction or experience

with alphabetic arthography. The segmentation abilities improve with reading instruction but whether reading improves segmentation is still unanswerable and requires further investigation.

Thus studies of subjects from different language backgrounds have provided considerable support for the possibility of significant relationship between phonemic segmentation and mastery of the alphabetic principle (Shankweiler and Liberman, 1989).

Additional supports come from observations such as phonological awareness skills having been found to predict later success in reading (Blachman, 1983; Bradley and Bryant, 1983). Also training in meta-linguistic awareness helps children learn to read (Bradley and Bryant, 1985).

Lundberg et al. 1980, Torneas, 1984; Tunmer and Nesdale, 1985; utilize path analysis techniques to show that phoneme segmentation skills are directly related to reading and spelling performance. On the other hand opposing view also has been put-forth by many authors. They claim that phonological awareness is a product and not a prerequisite to learning to read. (Vygotsky, 1962; Donaldson, 1978; Ehri, 1979, 1984, 1985; Morais et al. 1987). These authors argue that the process of learning to read is in itself responsible for raising

child's awareness of language. However, whether phonological awareness is a cause or an effect of reading, the existence of a strong correlation between the two has been frequently demonstrated (Bradley and Bryant, 1978, 1983).

Orthography, Phonology and Reading:

Orthography refers to the role of a writing system. Earliest writing system was picture writing. Present day writing systems can be classified into three types of writing systems on the basis of their level of representation. They are (a) ideography (b) syllabary (c) alphabetic. Ideographic scripts such as Chinese represents the language at morphemic level, syllabaries like Kana at syllabic level and alphabetics like English at morphophonemic level (Ellis, 1984 gives more details about development of these systems).

Carello and Turvey (1985) from their study have concluded that the relationship between script and speech differs among the various orthographic categories. It is generally assumed that alphabetic script puts the heaviest and ideographic the least while the syllabary poses an optimal level of demand on readers.

A cross cultural study in American and Japanese children by Mann (1986) showed that in contrast to the American first

graders who tend to be aware of both syllables and phonemes, almost all first graders in Japan were aware of Mora (phonological unit roughly equivalent to syllables) but relatively few were aware of the phonemes. This difference could be attributed to the fact that Japanese first graders learn syllabary where as American first graders learn to read alphabet. Cossu et al. (1987) in a comparative study of English and Italian children found a discrepancy in the scores of segmentation ability which seemed to reflect phonologic and orthographic differences between the languages. Rekha (1987) did not find phonological awareness to play a role in Kannada reading children which presents a semi-syllabic script. These children, who are exposed to syllabic or semi-syllabic scripts thus can become proficient readers without being good in phonological segmentation task.

Thus review suggests that primary literacy skills such as reading and writing demands children to exercise their ability to deal explicity with the structural features of the spoken language while deciphering the print. There are numerous studies reported over the last decade which suggest that poor readers in contrastto normal ones are reported to be deficient in use of morphology and syntax, and poor in phonemic analysis, structural ambiguity detection, gramaticality judgement, synonymy judgement, message consistency judgement etc. (Fletcher et al. 1981; Downing and Valtin,

1984; Tunmer, Pratt and Harriman, 1984; Prakash, 1987). Nevertheless, it is phonological awareness which caught utmost interest among the researchers because of its intimate yet intricate relationship with learning to read and write. Phonological awareness which includes awareness of phonological strings (awareness of phonological length, sound similarity etc.), awareness of syllables, awareness of phonemes (also called segmental awareness) and awareness of phonetic features (Morais et al. 1987) is considered to be a bridge between language and literacy (Morais, 1989). However, among the researchers in the field there are divergent views with regard to the nature of relationship ie. whether phonological awareness is a prerequisite (for learning to read), a facilitator or a consequence of learning to read and write. To add to this controversy, there is also a debate about the consequences and constraints different writing systems would force on the part of the reader. A non-alphabetic writing system while not requiring or facilitating phonological awareness to the same extent as alphabetic scripts may allow development of phonological awareness to a certain degree depending on the specific orthographic features present which favour such an awareness. Prakash, Rekha, Nigam and Karanth (forth-coming) on the basis of a series of studies conclude that one's ability to manipulate the structural features of language is facilitated by

literacy acquisition process and the level of representation of language puts a constraint on the extent to which phonological awareness could be developed.

Thus the review shows that most of the studies were done initially in alphabetic script and the focus has then shifted to compare the results of users of alphabetic and non-alphabetic writing systems. More cross orthographic studies are indicated.Gujarati being a semi-syllabic orthography, such a study in Gujarati is warranted.

METHODOLOGY

The present study is a cross-sectional one involving three groups of children senior K.G.(SKG) grade I and grade II. These children have been selected from two schools in Bombay. One with medium of instruction being English and the other Gujarati. However, all children came from Gujarati speaking families.

PROCEDURE:

Five good and five poor readers were selected randomly from each of the six classes based on teacher's rating. When the poor readers of any grade were reported to be unable to read, students ranked as average were selected. Each of the subjects was administered individually the following tests in the order of -

- Listening comprehension
- Word reading test a part of Boder Reading Test (for English medium children) and word recognition test which is a part of criterion referenced tests for reading and spelling in Gujarati (for Gujarati medium children).
- Measures of phonological awareness.

  These are rhyme recognition
  syllable stripping
  phoneme stripping

The testing was done in a separate room adjacent to the classroom. Responses were directly noted down on the response sheet (Shown in Appendix I). The recording of these was done using a Phillips tape-recorder (with an inbuilt mic) whenever possible.

The different tests administered, their purpose, administration and scoring procedures are described below:

(**1) Listening comprehension** - It is a common test administered on both English and Gujarati medium children. The purpose of this test was to determine child's language level.

It is a subtest from Criterion Referenced Tests for Spelling and Reading (Mohite and Sharma, 1986) which tests the child's ability to comprehend and answer correctly the questions based on the paragraph read. It consists of 9 paragraphs each followed by a few questions. Each of the stories was told twice to the children before asking questions.

Instructins: "I will tell you a story now. Listen to it carefully. Then I will ask you some questions from it which you will be required to answer. Please ask me to repeat if you do not understand".

Scoring: Score of one for each correct and zero for each incorrect answer was given.

(2) Word reading/word recognition tests:- Due to paucity of reading tests in Indian languages, the researchers in this area have usually depended on one of the following two measures.

- List of words ranging from easy to difficult which the child of particular age isexpected to read. As for example Jayabai's (1958) list in Kannada.
- Use of Criterion Referenced Tests.

In the present study, the English medium group was administered a part of "The Boder Test of Reading and spelling Patterns"(1982). A subtest on word recognition from "Criterion Referenced Tests for Spelling and Reading" in Gujarati was administered to children from Gujarati medium.

The Boder Test is a reading and spelling test in English developed by Boder (1982). It offers a systematic way to compare the reading-spelling pattern of any child (or adult) with the reading-spelling pattern of normal readers. The test identifies five reader subtypes which include normal and 4 reading disability subtypes. The test consists of twelve lists with 20 words in each. The test has both

timed and untimed versions and depending on the clients response, one can work out a reading quotient (RQ). A reading quotient of 100 is considered to be normal. This along with spelling patterns helps to identify the reading disabled population. This test has not been standardized on Indian population however, it was used in the present study due to non-availability of a similar test in English standardized on Indian population. In the present study, the first four lists of the test ie list-A (pre-primer), list-B (primer), List-1 (grade-1), List-2 (grade 2) as standardized by Boder on his population were used. Since there are no Indian norms for the test. List A, B, 1 were administered to UKG and I grade children and List B, 1, 2 were administered in II grade children. The test was not timed.

Instructions: "Do you know how to read? Now I want you to read some words. Please read them carefully".

Scoring: A score of one for each correct and zero for each incorrect response.

Word recognition test is a subtest of Criterion Referenced Test of Spelling and Reading in Gujarati developed by Mohite and Sharma (1986) in Baroda. It consists of a

list of 45 words which the child is required to point to and say correctly. It was developed with the aim of determining difficulties the student faces in reading and spelling and the type of difficulties faced, on the basis of the criterion for acceptable performance specified.

Instructions: "You will be shown a word on a card for a brief period of time after which you will be given a set of three words from which you will be asked to point and say the word you just saw".

Scoring: A score of one for each correctly pointed and read word and a zero for an incorrect response.

Thus while these two tests are structurally different, they both aim at achieving the same objective and hence were used in the present study.

(3) Phonological Awareness - It consisted of 3 subjects. (i) **Rhyme_recognition** - It consisted of 24 pairs of stimuli words of which 12 were rhyming and 12 non-rhyming. Six of these pairs (3 from each category) were used as practice items.

The rhyming and non-rhyming pairs were randomly presented to the children through live voice and the children were required to say whether they rhymed or not.

Instructions: "I will now tell two words. Listen to them carefully and see if they are rhyming words such as 'jill-hill' as in your nursery-rhymes. If you feel they are rhyming tell 'yes'. If they do not rhyme say 'no'". A number of practice trials were given to the children to make sure that they understood the nature of the task

Gujarati medium children were given the same instructions with examples of Gujarati rhyming pairs (such as rʌm - dʒʌm, k^nadɒ - padɒ, etc.)

Scoring: A score of 1 for each correct and zero for each incorrect response.

(ii) Syllable stripping - This sub-test consisted of 12 trisyllabic words each for Gujarati and English medium children. Three items were used for practice trials. These words were randomly selected from textbooks of senior K.G., I grade and II grades. The task was to remove either Ist, 2nd or the 3rd syllable, and the subject was required to say the remaining.

Instructions: "I will now say a word and then remove a part of it. You should tell me what remains afterwords". If the child did not understand, the instructions were repeated and the child was asked, "what will remain if you remove_____from_____(eg. What will remain if you remove to from potato)

Scoring: Bach correct response was given a score of 1.

(iii) Phoneme stripping - This subtest also constituted 12 items each for both Gujarati and English medium children. However here the words were either monosyllables, bisyllables or trisyllables. These words also were randomly chosen from the textbooks of the children. The task was to remove a phoneme in either initial medial or final position and say the rest. Example - forgo - foro (See Appendix II for list of materials).

Instructions and scoring were the same as that for syllable stripping.

The results of the study are presented and discussed in the following chapter.

RESULTS AND DISCUSSION

The present study was aimed at comparing the nature of relationship between phonological awareness and learning to read, across two orthographies one alphabetic (English) and the other semi-syllabic (Gujarati). Sixty children (30 exposed to an alphabetic script and 30 to a semi syllabic script) taken from senior K.G.(SKG), I standard and II standard served as subjects. A teacher's rating scale was used for selection of the subjects (as described in methodology). All the children studied, came from Gujarati speaking families. Each of the subjects was administered-

- a test of listening comprehension
- a test of word reading (for English medium) and word recognition (for Gujarati medium children)
- measures of speech segmentation ability.

The results obtained have been tabulated and discussed below with the hypotheses to be tested.

Before discussing the results of the first hypothesis, results obtained on the tests of listening comprehension and word reading/word recognition have been discussed.

Table-1: Means and standard deviations of the scores of listening comprehension of English and Gujarati medium children of the three classes.

Class	Medium			
	English		Gujarati	
	Mean	S.D.	Mean	S.D
SKG	42.28	7.8	49.56	8.9
I Std.	51.10	10.71	51.24	13.65
II Std.	56.37	8.17	57.43	17.07

Listening comprehension as described earlier was a subtest of Criterion Referenced Test of Reading and Spelling in Gujarati. According to the established norms, it expects that a 100% score be obtained by I standard level. As is clear from the table, this criteria was not reached even by the II graders of the present study. This could be attributed to the fact that the test used is a Criterion Referenced Test and is prepared in Baroda, depending on the criteria teachers think should be met by children. The same criteria may not be true for schools in Bombay. Secondly, it has been standardized only on 40 students (10 top rankers of each I to IV grades) of one of the schools in Baroda. However, it is important to note that irrespective of the medium of instruction, both the groups are performing almost equally.

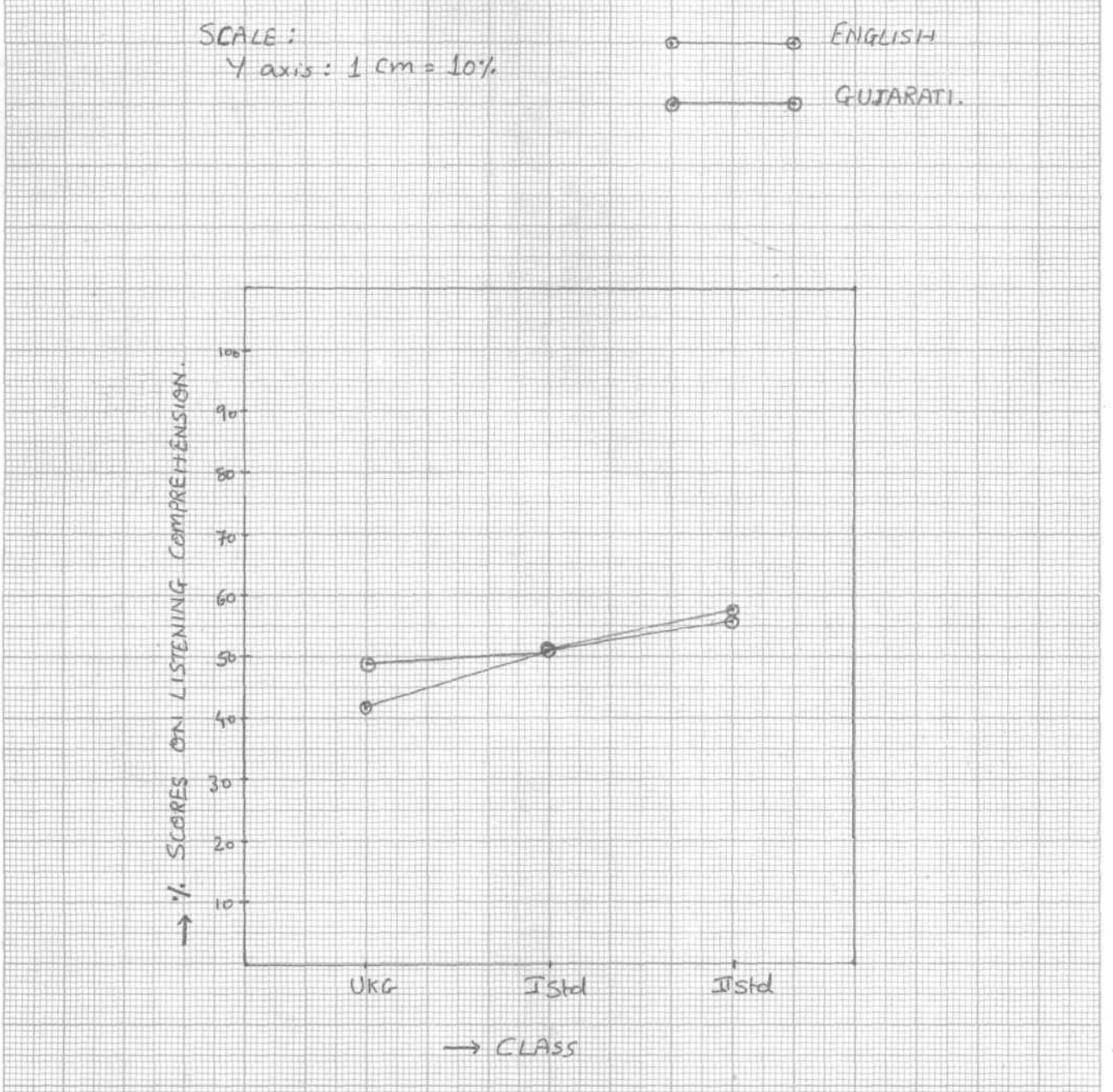
This is seen also in graph 1. It is also observed that the performance is improving slightly over the three grades.

Table-2: Means and standard deviations of the scores of word reading and word recognition test for the English and Gujarati medium children respectively.

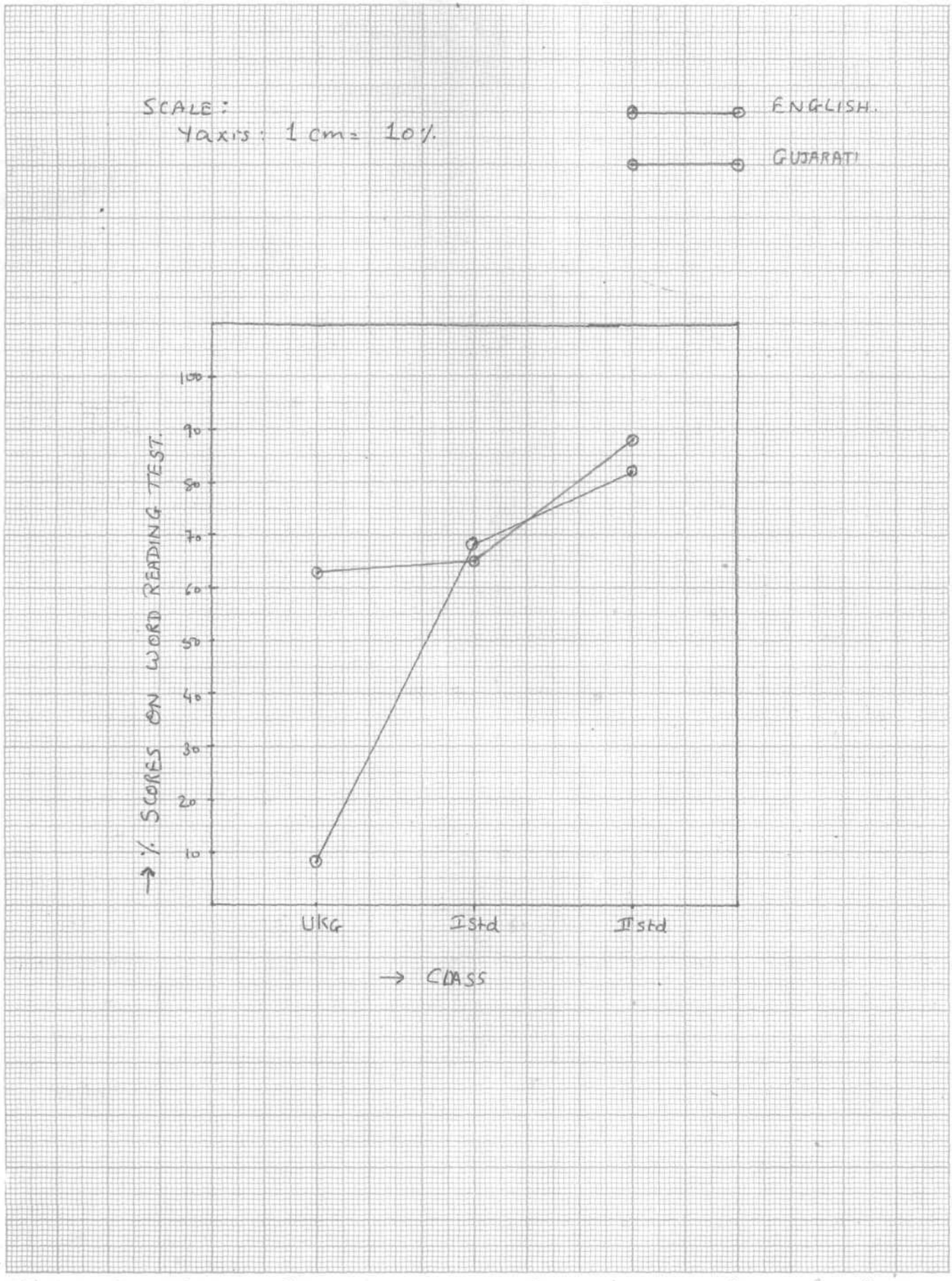
	Medium			
Class	English		Gujarati	
	Mean	S.D.	Mean	S.D
SKG	8.33	6.85	63.22	25.58
I Std.	68.0	31.09	65.55	18.66
II Std.	82.16	12.32	68.55	12.16

These mean scores have been plotted in graph 2. The table and the graph clearly show that the scores on word reading test are poorer for SKG and there is a sudden improvement in the Ist grade for English medium children. Such a poor performance for the SKG children could be due to the use of Boder test for which norms on Indian population are not available. Secondly, it must be noted that list A, B and 1 are administered to SKG children because of non-availability of Indian norms.

Word recognition which is a subtest of Criterion Referenced Test for Spelling and Reading in Gujarati was administered to children from Gujarati medium. The table



GRAPH 1: MEAN PERCENAGE OF SCORES OF ENGLISH & GUJARATI MEDIUM CHILDREN ON LISTENIG COMPREHENSION.



GRAPH 2: MEAN PERCENTAGE OF SCORES OF ENGLISH & GUJARATI MEDIUM CHILDREN ON WORD READING TEST.

indicates that the mean performance of SKG and I standard children is nearly the same but standard deviation for SKG is much higher than in Ist graders. Mean performance of IInd graders is significantly better with relatively less standard deviation. Such a difference can be explained by looking at the structure of words in the test. The test consists of words with CVCV, CCV and CCVCV combinations. It was reported by the teachers of the school that the words with some secondary forms of vowels other than those present in base syllabary and words with secondary forms of consonants (CCV, CCVCV) have not been taught to their KG and Ist graders.

Comparing the performance of the English and Gujarati medium children, it is seen that English medium SKG children perform much poorer than the gujarati medium KG children. Inview of the fact that no attempt was made to control previous exposure to reading across both groups. This difference cannot be interpreted appropriately. It must be noted however that while the Gujarati medium children were Gujarati speakers learning to read in Gujarati, the English medium children were Gujarati speakers learning to read in English. This difference could have contributed to the unequal performance in the early stages. What is important from thepoint of view of this study however is that word reading skills of both groups were on par by Ist and 2nd grade.

Now, coming to hypothesis I, which is as follows.

I(A): There is a significant difference in performance of English ana Gujarati medium children on speech segmentation tasks(combined scores) for each of the three classes tested.

I(B): There is a significant difference in performance of English and Gujarati medium children on -

(i) Rhyme recognition

(ii) Syllable stripping

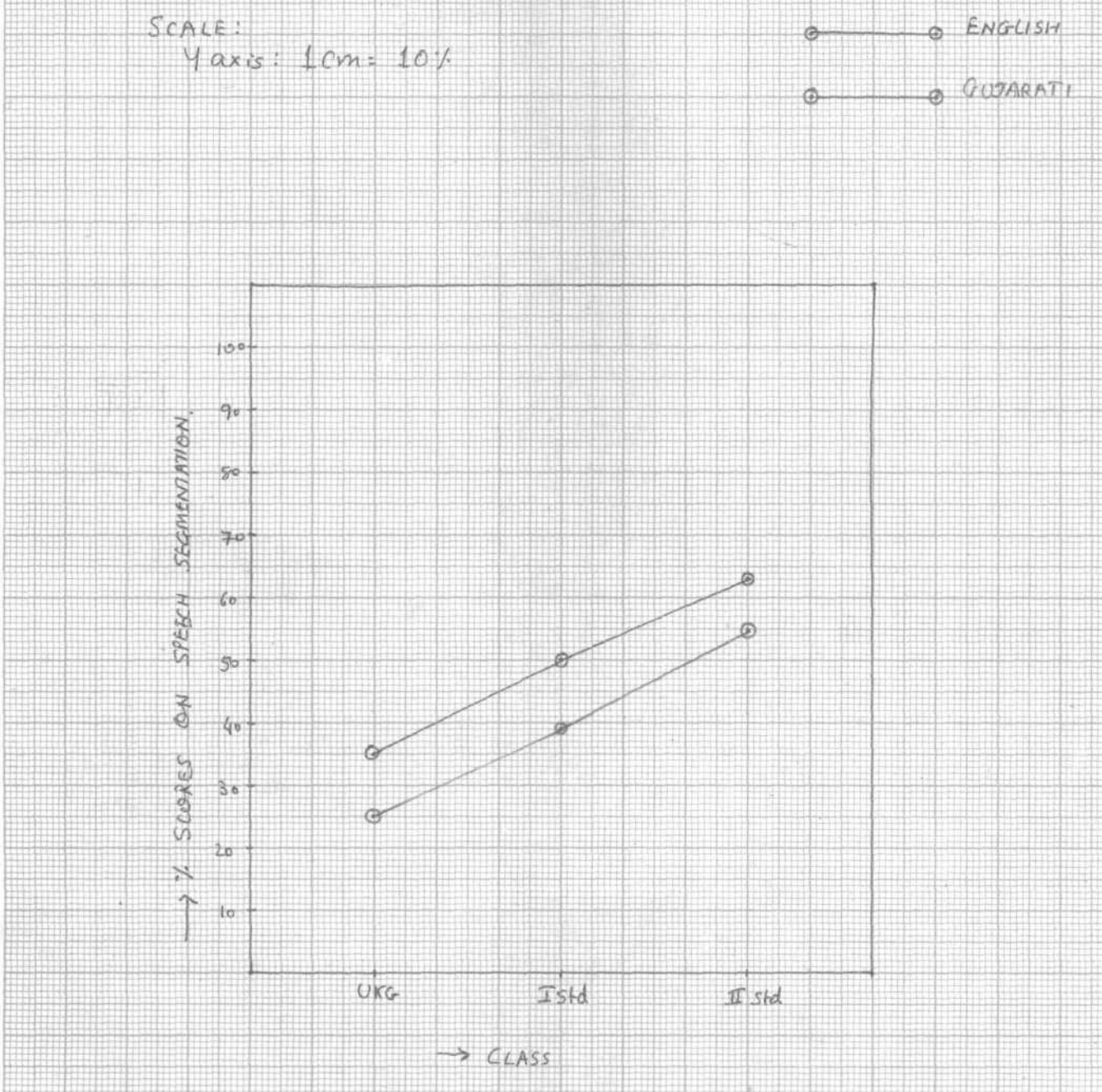
(iii) Phoneme stripping

for each of the three classes tested.

Table-3: Means and standard devisions of the combined scares of speechsegmentation tasks of English and Gujarati medium children of the three classes tested.

Class	Medium			
	English		Gujarati	
	Mean	S.D.	Mean	S.D.
SKG	35.0	11.58	25.70	9.09
I Std.	50.83	14.64	39.44	12.88
II Std.	63.88	20.41	55.27	11.67

It is seen that the English medium children perform better than Gujarati medium children on speech segmentation tasks Graph 3 which indicates the same scores is seen to run parallelly for English and Gujarati medium children.



GRAPH 3: MEAN PERCENTAGE OF SCORES OF ENGLISH & GUJARATI MEDIUM CHILDREN ON SPEECH SEGMENTATION TASKS (COMBINED)

Further an analysis of variance was applied to see if the difference in performance is significant. ANOVA yielded F ratios of 3.92, 4.41, 2.93 for SKG, I standard and II standard respectively, none of which are significant.

Further, scores for each speech segmentation task and the results of analysis of variance havebeen determined and are presented below:

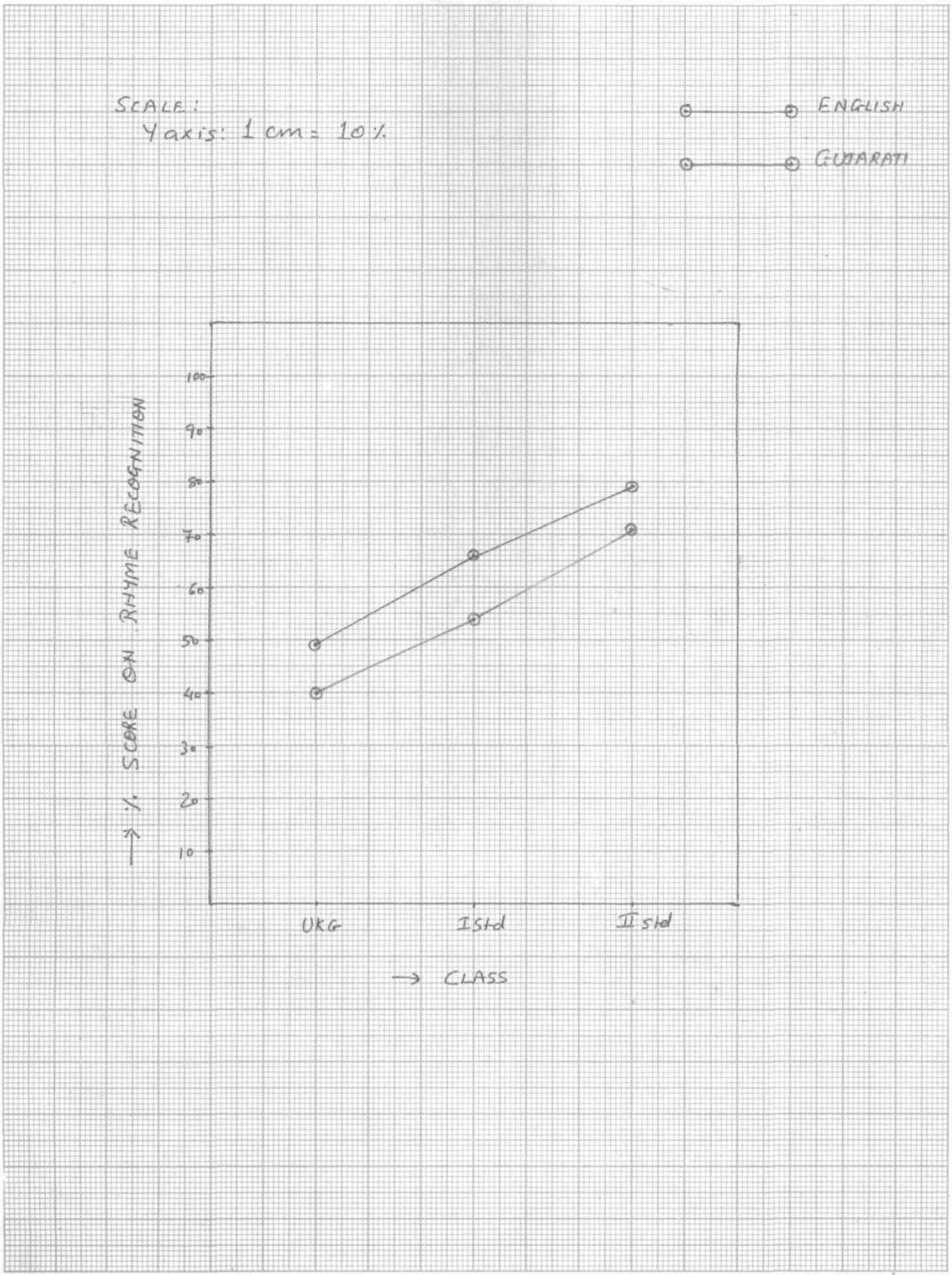
Table-4: Means and standard deviations of the scores of individual segmentation tasks for both the English and Gujarati groups over the three grades.

Class	Medium	Segmentation tasks					
		Rhyme recognition		Syllable stripping		Phoneme stripping	
		Mean	S.D	Mean	S.D	Mean	S.D
SKG	English	48.88	13.20	32.22	21.24	10.0	12.22
	Gujarati	40.55	19.60	18.88	14.88	2.22	4.68
I Std	English	66.10	16.65	52.22	24.02	22.22	19.59
	Gujarati	54.44	22.79	54.44	18.48	3.33	5.36
II Std	English	78.88	21.72	55.55	21.59	44.44	20.95
	Gujarati	71.10	15.88	68.88	20.82	10.0	9.72

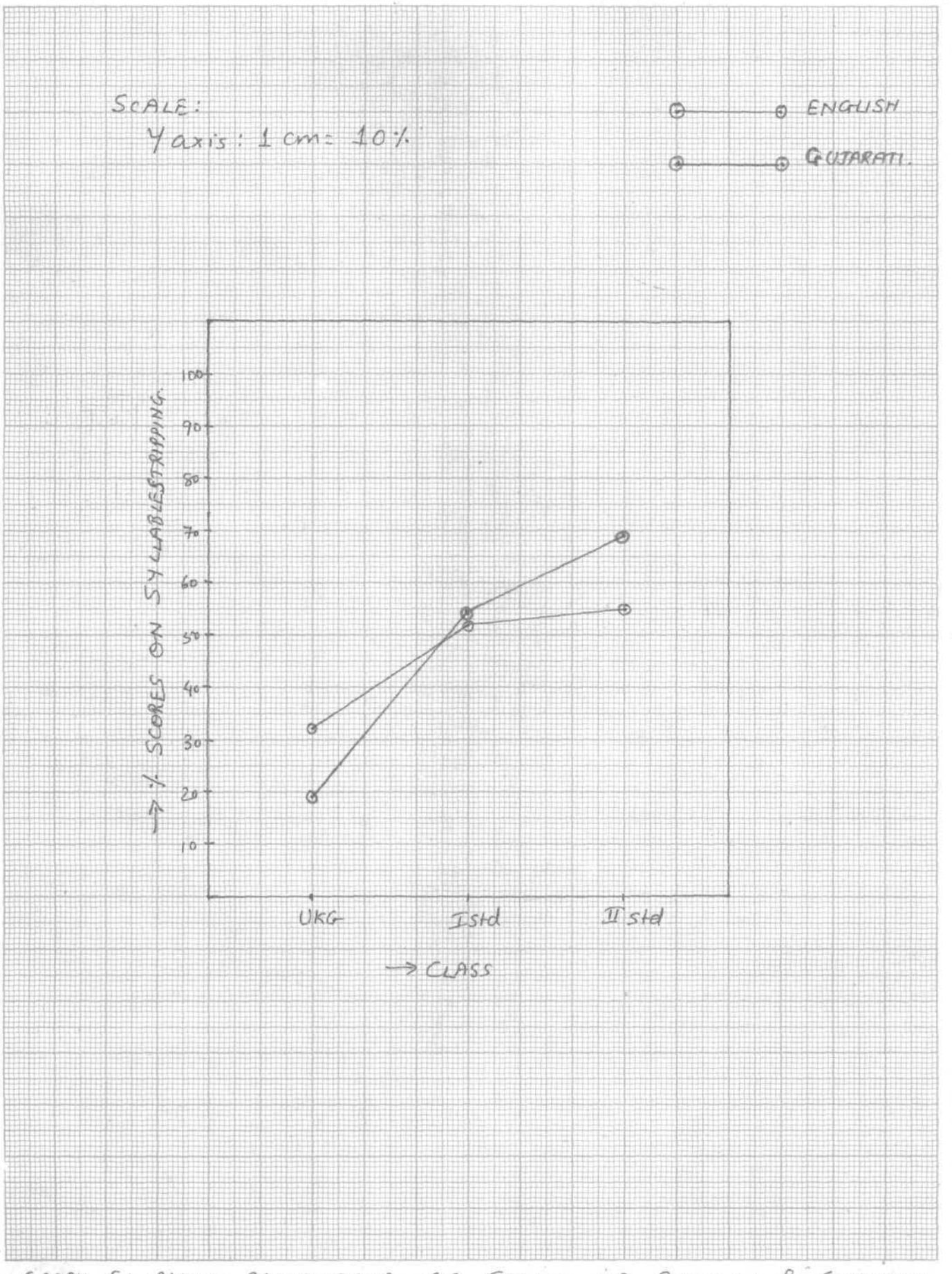
(i) Rhyme recognition - The mean scores on rhyme recognition task is seen to improve over the three grades for both English and Gujarati medium children. But on a comparison of the scores, English medium children on an average are

performing better than the Gujarati medium children for all the three grades. Graph 4 which shows mean rhyme recognition scores plotted for English and Gujarati groups is seen to run parallelly. However, an analysis of variance for this task over the three grades did not yield a significant F ratio (See table 5). It is worth mentioning here that Yopp (1988, Cited in Morais, 1988) in his study administered 10 phonological awareness tests to children and on factor analysis rhyming tests grouped separately from other phonemic tasks, suggesting that underlying abilities are different. Though rhyming ability and segmental awareness might have some commonality, in one of their studies Prakash and Chandrika (in preparation) found that illiterate poets who were good at appreciating and manipulating rhymes could not say why two words rhyme. Thus rhyming ability may not be critical for learning to read and write.

(ii) Syllable stripping - Table 4 shows that the mean performance for syllable stripping task is also improving from SKG to 2nd grade for both English and Gujarati medium children. Comparing the mean performance of English and Gujarati groups, it is found that except in SKG, Gujarati medium children are performing better on this task. This is clearly indicated in graph 5. The better performance of the Gujarati medium children could be attributed to their



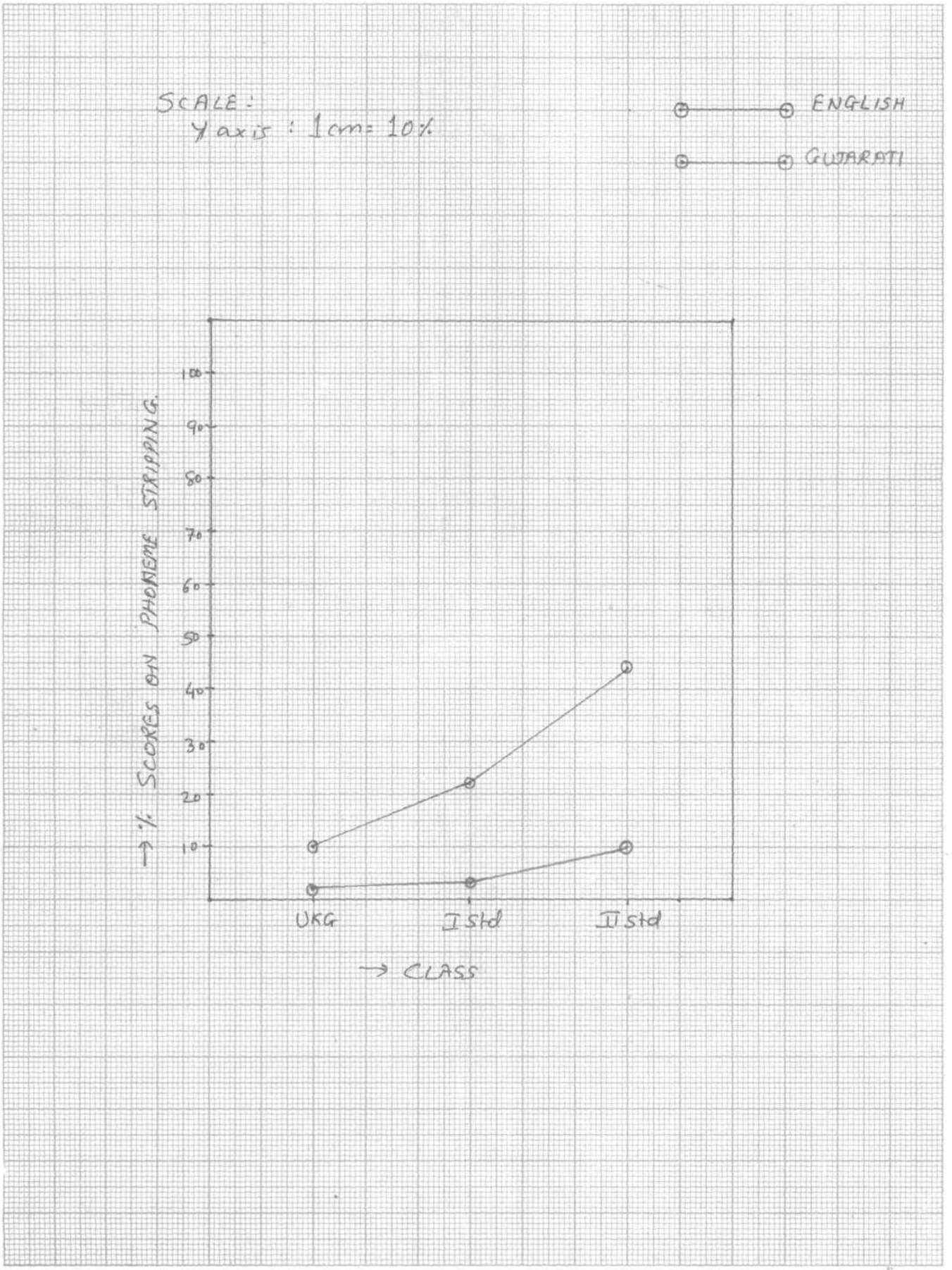
GRAPH 4: MEAN PERCENTAGE OF SCORES OF ENGLISH & GUJARATI MEDIUM CHILDREN ON RHYME RECOGNITION TASK.



GRAPH 5: MEAN PERCENTAGE OF SCORES OF ENGLISH & GUJARATI MEDIUM CHILDREN ON SYLLABLE STRIPPING TASK.

exposure to semi-syllabic orthography, which delimits syllabographs. An analysis of variance between English and Gujarati medium scores of the three grades, however did not yield a significant difference (F values in Table-5).

(iii) Phoneme stripping - Table 4 along with graph 6 indicates that the average scores for this task are the highest for the second graders. However, it is also seen that this increase in scores is much faster for English medium than for Gujarati medium children with the performance of Gujarati medium children remaining almost the same over the three grades. This when seen in relation to other speech segmentation tasks, indicates that such a difference between English and Gujarati medium children's performance is unique to this task. This is further supported by the results of analysis of variance between scores of English and Gujarati medium children, which yielded a significant F ratio of 8.46 and 22.23 for the Ist and IInd grades respectively. However, there was no significant difference in the performance of SKG children of the two groups. It appears that the combined scores of speech segmentation abilities would have largely been affected by the scores of rhyme recognition and syllable stripping neither of which are showing a significant difference in scores between English and Gujarati medium children,



GRAPH 6 : MEAN PERFORMANCE OF SCORES OF ENGLISH & GUJARATI MEDIUM CHILDREN ON PHONEME STRIPPING TASK

The poor performance of Gujarati medium children on phoneme stripping task could be because level of representation of Gujarati orthography is not at phoneme level. As such, these skills may not develop fully even at higher grades until and unless these children are exposed to English. Thus it becomes clear that exposure to an alphabetic script does result in heightened phonological awareness. This is in agreement with one of the most important contributions of Brussels group (Morals and associates) that there is a special relationship between phonemic awareness and alphabetic literacy. Their study of Portuguese illiterates (Morals et al. 1979) and subsequent studies (Morals et al. 1986, Read et al. 1986) provided a strong evidence that some form of speech manipulation such as rhyme recognition and syllable segmentation are developed spontaneously while phonemic awareness is linked not to literacy in general but to alphabetic literacy in particular. Ehri's hypothesis of "orthographic image" (Ehri, 1980) which suggested that alphabetic system makes the language visible at the phonemic level altering children's perception of spoken language also supported the above conclusions. Mann (1986) however showed that Japanese children not exposed to alphabetic writing could successfully perform the segmentation tasks by the time they enter forth grade. Morais (1988) interpreted this in terms of phonemic like features of Japanese syllabary:

It implies that on the whole writing system need not necessarily be alphabetic for the development of phoneme awareness. A non-alphabetic writing system may allow such a development to a certain degree depending on the specific orthographic features which favour that.

It may be seen from tables 1 to 4 that for most of the tests the S.D. from the mean scores is very high. Such high values of S.D. could be attributed to the selection criteria used. 5 good and 5 poor readers were selected from each class based on teacher's rating to serve as subjects. Certain other factors which are also related to reading such as intelligence, socio-economic status, amount of exposure at home, could not be controlled in the present study thus yielding quite a hetrogenous sample explaining the high S.D. values.

Table-5: Results of ANOVA between the two groups (English and Gujarati) on different segmentation tasks.

Tasks	Class		
	SKG	I Std.	II Std.
Speech segmentation(combined)	F=3.92	F=4.41	F=2.93
Rhyme recognition	F=0.14	F=1.73	F=0.83
Syllable stripping	F=2.64	F=1.6	F=1.97
Phoneme stripping	F=3.52	*F=8.46	*F=22.23

* The difference is significant at 5% level.

Thus hypothesis I(A) is rejected and I(B) (i) and (ii) are rejected where as hypothesis I(B) (iii) is accepted as a significant difference has been obtained on phoneme stripping task between English medium and Gujarati medium children.

Hypothesis-II - There is a significant difference in good and poor readers' performance on speech segmentation tasks for both English and Gujarati medium children.

As a pre-requisite to prove this hypothesis, it was necessary to confirm that a high correlation existed between teachers' rating and word reading scores for each of the groups.

Table-6: Spearmans Correlations between teacher's rating and word reading for different groups.

Class	Medium			
	English		Gujarati	
	Children rated good	Children rated poor	Children rated good	Children rated poor
SKE	-0.06	0.81	0.205	0.56
I Std.	-0.44	0.78	0.00	-0.29
II Std.	0.69	0.89	0.82	0.00

Table-6 shows that only for English medium II Standard, both good and poor groups show a high correlation between

their performance on word reading and the teacher's rating. In none of the other classes, did teacher's rating correlate with word reading. Thus teacher's rating could not be taken as valid. However it may be also possible that test findings were itself not very reliable in view of the lack of large scale norms on Indian children. Thus due to poor correlations between teacher's rating and word reading, the second hypothesis could not be tested.

Hypothesis-III(A) - There is a high correlation between word reading and speech segmentation ability for English medium children.

III(B) - There is a high correlation between word reading and speech segmentation ability for Gujarati medium children.

Karl Pearson's coefficient of correlation between reading ability and speech segmentation ability for English medium children was found to be 0.43, 0.76 and 0.89 for SKG, I standard and II standard respectively.

Table-7: Showing Karl Pearson's coefficient of correlation between word reading and individual segmentation tasks for the English medium children.

Class	Tasks		
	Word reading & rhyme recognition	Word reading & syllable stripping	Word reading & phoneme stripping
SKG	0.41	0.28	0.27
I Std.	0.45	0.67	0.80
II Std.	0.78	0.82	0.80

Above table shows that in the English medium children, word reading correlates highly with all three individual speech segmentation tasks with the correlations increasing with increase in reading abilities and exposure. This shows the intimate relationship of word reading with speech segmentation tasks. Such observation have also been made by Bradley and Bryant (1978, 1983). Thus as reported by them, speech segmentation tasks may help predict later success in reading. However such results need to be confirmed by carrying out longitudinal research. Such results do not rule out the opposite arguement that speech segmentation ability is a product of learning to read (Ehri, 1979, 1984, 1985; Morais, et al. 1987).

A correlation of 0.52, -0.40 and 0.62 for SKG, Istandard and II standard respectively was obtained between word reading and speech segmentation ability (combined score) for Gujarati medium children.

Table-8: Showing Karl Pearson's coefficient of correlation between word reading and individual segmentation tasks for the Gujarati medium children.

Class	Tasks		
	Word reading and rhyme recognition	Word reading and syllable stripping.	Word reading and phoneme stripping
SKS	0.53	-0.06	-0.29
I Std.	-0.58	-0.12	-0.12
II Std.	0.48	0.46	0.49

Looking at the correlations between word reading and individual segmentation tasks for Gujarati medium children, it is found that there is not only low to moderate correlation between these variables but negative correlations are also obtained between word reading and each of these tasks for some of the grades. Somewhat similar findings have been reported by Rekha (1987) in her study on Kannada Ist, IInd and IIIrd grades (Kannada is also a semi-syllabic script). Such findings are contradictory to the results obtained on children learning to read alphabetic scripts and are consistent with the supposition that learning to read semi-syllabic orthography is not as closely related to speech segmentation ability as in alphabetic scripts.

Thus hypothesis III(A) is accepted but III(B) is not accepted where varied correlation values are obtained between the mentioned variables.

CONCLUSIONS:

The above results indicate that -

(i) There is no significant difference in the speech/segmentation ability in general of the children exposed to either alphabetic or semi-syllabic script.

(ii) Children of both the groups perform almost equally on rhyme recognition test.

(iii) Syllable stripping scores of Gujarati medium children is slightly better than English medium children, however the difference is not significant.

(iv) A significant difference in phoneme stripping task between English medium and Gujarati medium children in favour of the English medium children shows that such phoneme level tasks are sensitive to orthographic variations.

(v) Teachers rating scale is not found valid in the present study.

(vi) Word reading and speech segmentation ability are highly correlated for English medium children. However correlation between these tasks is low to moderate and at times negative for Gujarati medium children.

IMPLICATIONS OF THE STUDY:

It has been asserted by researchers in the field that phonological awareness is a precurssor to success in learning to read. However, such findings should be treated with caution because -

(i) different phonological awareness tasks are found to correlate differently with reading abilities.

(ii) phonological awareness which has been singled out as a precursor to success in learning to read is so particularly in alphabetic script but such findings may not be generalized with regard to other non-alphabetic orthographies.

Orthographic features are an important variable in sensitizing children to metalinguistic tasks such as speech segmentation abilities. Exposure to the alphabetic script leads to better performance on speech segmentation tasks such as phoneme stripping and it correlates highly with reading abilities in these languages. The children exposed to the semi-syllabic script did not perform well on specific speech segmentation tasks such as phoneme stripping. Further their performance on the speech segmentation tasks did not correlate well with word reading. This would imply that learning to read in an alphabetic script not only goes with better speech segmentation abilities but also that the former is a pre-requisite for the later.

SUMMARY AND CONCLUSIONS

The present study was planned to compare the extent of relationship between phonological awareness and orthographic features in learning to read. Sixty children all coming from Gujarati speaking families were selected as subjects from two schools in Bombay. These children were administered a test of listening comprehension, word reading (English medium) and word recognition (Gujarati medium) and measures of speech segmentation.

The results of the study support the following conclusions.

(i) There is no significant difference in the speech segmentation ability as a whole of the children exposed to either alphabetic or semi-syllabic script.

(ii) Rhyme recognition scores of the two groups are almost similar.

(iii) Syllable stripping scores of the children exposed to semi-syllabic script are slightly better than those exposed to alphabetic script, however, the difference is not significant.

(iv) There is a significant difference in phoneme stripping task between English and Gujarati medium children in favour of the English medium children. This shows that such phoneme level tasks aresensitive to orthographic variations.

(v) Word reading and speech segmentation ability are highly correlated for English medium children. Correlations between these tasks is low to moderate or even negative at times for Gujarati medium children.

However, the study being a small and cross-sectional one has its own limitations. One of the major limitation of the study is selection criteria for subjects where factors such as intelligence, vocabulary, overall stimulation at home, amount of exposure toreading material at home etc. have not been controlled. The results of this study can be confirmed by doing the study taking these factors into considerations. Generalization of the results of the present study should be done with caution.

APPENDIX-I

(Response Sheet)

Name of the student: Class:

(A) Teacher's rating

(B) Listening comprehension

No.	a	b	c	d	e	f	g	h	i
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									

(C) Word reading/word recognition

No.	Item	Child's response	✓/x	No.	Item	Child's response	✓/x
1.				11.			
2.				12.			
3.				13.			
4.				14.			
5.				15.			
6.				16.			
7.				17.			
8.				18.			
9.				19.			
10.				20.			

No.	Item	Child's response	✓/x	No.	Item	Child's response	✓/x
21.				41.			
22.				42.			
23.				43.			
24.				44.			
25.				45.			
26.				46.			
27.				47.			
28.				48.			
29.				49.			
30.				50.			
31.				51.			
32.				52.			
33.				53.			
34.				54.			
35.				55.			
36.				S6.			
37.				57.			
38.				58.			
39.				59.			
40.				60.			

(D)(i) Rhyme recognition

No.	Item	✓/x	No.	Item	✓/x	No.	Item	✓/x
Practice items								
1.			3.			5.		
2.			4.			6.		
Test items								
1.			7.			13.		
2.			8.			14.		
3.			9.			15.		
4.			10.			16.		
5.			11.			17.		
6.			12.			18.		

(ii) Syllable stripping

No.	Item	Expected response	Child's response	✓/x
Practice items				
1.				
2.				
3.				

No.	Item	Expected response	Child's response	✓/x
Test items				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				

(iii) Phoneme stripping

No.	Item	Expected response	Child's response	
Practice items				
1.				✓/x
2.				
3.				
Test items				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				

APPENDIX II

(Materials used)

(i) English medium

Lists of words from Boder Test

List A	List B	List-1	List-2
l.big	l.did	1.after	l.ever
2.come	2.are	2.bird	2.does
3.can	3.fast	3.came	3.faster
4.have	4.blue	4.funny	4.eyes
5.help	5.on	5.dog	5.name
6.little	6.boat	6.horse	6.right
7.not	7.run	7.fish	7.show
8.mother	8.house	8.shoe	8.table
9.red	9.stop	9.man	9.step
10.said	10.play	10.was	10.talk
11.and	11.am	11.box	11.grass
12.ball	12.eat	12.apple	12.any
13.go	13.but	13.hand	13.keep
14.ride	14.father	14.girl	14.buy
15.in	15.no	15.sat	15.mach
16.the	16.train	16.store	16.city
17.up	17.with	17.under	17.nest
18.to	18.what	18.there	18.gone
19.we	19.yes	19.then	19.well
20.want	20.your	20.work	20.today

Items used for rhyme recognition:

Practice trials:

1. sit kit (R)	3.sit-bin(NR)	5.deep-beep(R)
2. lilly-silly(R)	4.1illy-gift(NR)	6.deep-hate(NR)

Test items:

l.big-dig(R)	7.fan-dig(NR)	13.tall-gold(NR)
2.fan-van(R)	8.kill-mill(R)	14.1ift-gift(R)
3.pin-kit(NR)	9.pin-bin(R)	15.table-lable(R)
4.gate-hate(R)	lO.cable-mill(NR)	16.kill-table(NR)
5.1ift-silly(NR)	ll.ball-cold(NR)	17.big-van(NR)
6.beep-gate(NR)	l2.cold-gold(R)	18.tall-ball(R)

Items used for syllable stripping:and phoneme stripping

Practice trials:	Practice trials:
1. Corona - ro - cona	1. Drink - d - rink
2. Dynamic - Dy - namic	2. English - 1 - Engish
3. Potato - to - pota	3. Drop - p - dro
Test items:	Test items:
1. Jocular - cu - jolar	1. flurry - f - lurry
2. Jupiter - ju - piter	2. demi - i - dem
3. lamina - na - lami	3. droop - r - doop
4. manilla - lla - mani	4. forgo - g - foro
5. Holiday - day - Holi	5. Crawl - c - rawl
6. gallery - lie - gary	6. Ideal - I - deal
7. Memory - me - mory	7. Mantis - s - manti
8. Canada - na - cada	8. crop - p - cro
9. Banana - Ba - nana	9. freak - r - feak

(ii) Gujarati medium:

Word recognition subtest of Criterion Referenced Test:

1. n∧m	16. ʃ∧ɳ∧gar	31. sundɖ^{h}
2. b^{h}∧m	17. k^{h}ur∧ʃi	32. ɖ^{h}ing li
3. ɖ^{h}∧g	18. ɖok	33. ang∧ɳU
4. g^{h}∧r	19. g^{h}odo	34. ʃ∧bd
5. r∧k∧m	20. em∧ne	35. fuggo
6. n∧g∧r	21. pur	36. pjalo
7. dʒ∧n∧k	22. sUm∧n	37. vaid
8. b∧r∧f	23. bUm	38. kailaʃ
9. l∧s∧ɳ	24. sUt^{h}ar	39. d^{h}∧rm
10. z∧r∧ɳ	25. Und∧r	40. f∧rjU
11. r∧dʒa	26. un	41. sv∧tʃ
12. tav	27. lili	42. tirt^{h}
13. mala	28. paɳi	43 praɳi
14. tara	29. p∧kʃi	44. pratap
15. ʧar	30. ij∧i	45. priti

Items used for rhymerecognition.

Practice items

1. r∧m - dʒ∧m(R)	4. taɭi-maɭi(R)
2. s∧r∧s-g∧r∧m(NR)	5. taɭi-pat∧lo(NR)
3. r∧m-g^{h}∧r(NR)	6. s∧r∧s-t∧r∧s(R)

Test items:

1. g^{h}ʌr-kʌr(R)
2. mʌn-lʌʈ(NR)
3. kʌr-dʒʌm(NR)
4. tʌn-mʌn(R)
5. nʌrʌm-gʌrʌm(R)
6. tʌn-pʌʈ(NR)
7. lʌʈ-pʌʈ (R)
8. nʌrʌm-tʌrʌs(NR)
9. radʒU-kadʒU(R)
10. radʒU-sadʒi(NR)
11. rotʌlo-k^{h}ʌ dʒUr(NR)
12. sadʒi-madʒi(R)
13. rotʌlo-tʃoʈʌlo(R)
14. k^{h}aʈʌlo-paʈlo(R)
15. maɭi-k^{h}aʈʌlo(NR)
16. madʒi-kadʒU(NR)
17. mʌdʒUr-k^{h}dʌUr(R)
18. mʌdʒUr-tʃ oʈʌlo(NR)

Items used for syllable stripping and phoneme strip

Practice trials

1. d^{h}olʌk-d^{h}o-lʌk
2. k^{h}ʌridi-ri-k^{h}ʌdi
3. sʌpʌnà-nà-sʌp

Practice trials

1. biladi-b-iladi
2. vitʃ ar-tʃ - viar
3. tʃʌkʌli-l-tʃʌki

Test items:

1. mat$\int^{h}$ʌli-ma-t$\int^{h}$ʌli
2. gʌrud-ru-gɑd
3. dikʌro-ro-dikʌ
4. sUrʌdʒ -sU-rɑdʒ
5. divali-li-diva
6. ijɑɭ - i-jɑɭ
7. mʌdari-da-mʌri
8. tʃʌ kʌli-li-tʃʌk
9. vitʃ aro-tʃ a-viro

Test items:

1. baɭʌko-b-aɭʌko
2. tʃopdi-p-tʃodi
3. gUlab-b-gUla
4. kʌpUr-p-kʌUr
5. sitar-s-itar
6. bʌgitʃ o-g-bʌitʃ o
7. murʌk^{h}o-m-Urk^{h}o
8. fʌrʌva-v-fʌrʌa
9. rotʌlo-l-rotʌo

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