# SPEECH SEGMENTATION ABILITIES AMONG LITERATES AND ILLITERATES

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TO

Papa and mummy for their boundless love, understanding, tolerance high ideals and capabilities which contributed significantly to my education and personal life.

CERTIFICATE

This is to certify that the Dissertation entitled: SPEECH SEGMENTATION ABILITIES AMONG LITERATES AND ILLITERATES is the bonafide work in part fulfilment for the degree of Master of Science (speech and Hearing), of the student with Register No.8609.

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## DECLARATION

This dissertation entitled: Speech Segmentation Abilities Among Literates and Illiterates, is the result of my own study under the guidance of Dr.Prathibha Karanth, Head of the Department 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.

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# INTRODUCTION

It is the power of speech which distinguishes man from other animals. Speech is a unique tool of communication which all human beings possess. But speech is far more than a means of communication because it involves language. While speech is an integral part of language, language has become one of the principle means of thought memory, introspection and problem solving and is related to all other mental activity. Speech is the realisation of our linguistic knowledge, in behaviour (Casden, 1977), while language is the actual linguistic ability which the humans possess.

Language or the linguistic activity involves speaking, listening, reeding and writing. Mattingly (1972) attempted to characterise the difference in terms of "primary" and "secondary" linguistic activity and suggested that while the primary linguistic activities such aa speaking and listening are natural in all human beings which emerge through maturation of some universal prewired machinery. Hence the fact that all children, allowed, some minimal linguistic input develop these primary linguistic activities and become experts with great facility, in the absence of

any training the individual will become aware mainly of the meaning of utterances and less aware of more superficial aspects such aa syntax and phonology. Reading on the other hand, like vereificiation is a secondary linguistic activity which is parasitic on activities the primary/and require "Linguistic awareness", a specially cultivated metalinguistic consciousness of certain aspects of primary linguistic activity. Linguistic awareness, language awareness, lexical awareness and metalinguistics are terms that have appeared with increasing frequency in reading theory literature and research in the 1970's and 1980's. The term "linguistic awareness" is used with a still broader meaning. As Sinclair (1981) notes, this term "Seems to include all the capacities end activities concerning language and language judgement which are not themselves a part of (or very closely tied to) production and comprehension processes. Any reflections, ideas, knowledge, or explicit formulation of underlying principles, rules etc., concerning language structure, functions or the rules for its use have been classified under the label "Linguistic awareness" or "metalinguistic activities* **(Pp44-45).**

Research on reading has in the last 15 years or so gone through a remarkable process of acceleration. As, a result reading is today one of the most actively investigated topics in cognitive science.

Reading behaviour is of interest to many different kinds of people - layman, professional educators, scientists

such as linguists, speech and language pathologist, and psychologist. Learning to read the orthography of a language is a skill and requires specific training seal instructional support of the kind generally provided by schools. Thus reading and writing forms a different category of skills from speaking and understanding speech, which develop in practically all hearing children independently of any deliberate effort on the part of the adults. Exactly how much specific training is required to learn to reed is not clear. Torrey (1979) reported esses of children who supposedly learned to read without any instructions but falls to provide critical information about the amount of support provided by environment.

In order to understand the alphabetic principle found in most written languages and to be able to profit from this principle in reading and writing, the child needs the appreciation that spoken language may be segmented into smaller units that are represented by letters. For more than a decade, evidence has been accumulating that learning to read and spell in an alphabetic writing system depends upon the skills known aa phonemic segmentation, - the ability to conceive of spoken words as sequences of phonemic segments and to identify and locate those segments within words and

syllables. Liberman (1971) wss among the first to identify the relationship. Learning to conceive of speech as a sequence of discrete segments is a crucial step in learning to read and write. Segmentation facilities learning to read primarily by making it possible for the reader to use spelling sound rules, an ability which is part of skilled reading.

Learning to read requires the segmentation ability. Now the question arises which comes first? Is segmentation a prerequisite to literacy, a consequence of literacy, or both? The emprical work has demonstrated a robust correlation between speech segmentation and reading performance. Better readers perform better on wide range of segmentation task, even when differences in general intelligence and socio-economic status have been controlled for. Read et al. (1986) reported that "segmentation" skill, which has been shown to contribute to skilled reading and writing, does not develop with cognitive maturation, non-alphabetic literacy, or exposure to a language rich in rhymes and other segmental contrasts. It does develop in the process of learning to read and write alphabetically.

Moris et al.(1986) studied the segmentation abilities in literates and ax-literates on battery of teaks designed

to assess the specificity of the effect of literacy training on speech segmentation. They concluded that while sensitivity to rhyme and analysis into syllables can develop upto some point in the absence of reading instruction, analysis into phonetic segment requires reading instruction.

Kaon (1986) examined the development of awareness about syllables and phonemes through a cross-cultural study of Japanese and American children. The results of her investigation showed that first grade children in America most of whom were aware of both syllables end phonemes, almost all first graders in Japan are aware of mora (phonological units roughly equivalent to syllables) but relatively few are aware of phonemes. She concluded "This difference in phonological awareness may be attributed to the fact that Japanese first graders learn to read a syllabary whereas American first graders learn to read an alphabet" (Pp.65).

As the earlier investigations on segmentation abilities and literacy have shown that better readers perform better than poor readers (Bradley and Bryant. 1976), Ex-literates perform better than illiterates (Moris et al. 1986) and children who learn to read an alphabet

perform better then those who learn to reed through syllabry (Mono, 1986), the present investigation at mad at studying the segmentation skills in adults literetes who learn to reed through syllabaries and in illiterates on a battery of task a which include rhyme recognition phoneme odditity, syllable stripping and phoneme stripping.

## REVIEW OF LITERATURE

Reading behaviour and it's acquisition is of interest to many different kinds of people - layman, professional educators, speech-language pathologists, linguistls and psychologists. Research on reading behaviour has shown e remarkable acceleration in the lest 15 years. As a result, reading is today one of the most actively investigated topics in cognitive science.

One might begin by asking what do we mean by the term "reading". One can observe that people do not confine the application of the word "reading" to interactions with books or other forms of text. People are said to reed graphs, maps, and clocks. Fortune tellers claim to "read" the lines in people's hand. The hearing handicapped "read" lips. The blind "read" the raised dots of braille by feeling than by their fingers. All of these behaviour commonly described as reading involve the Interpretation of signs and require different reeding techniques.

### DEVELOPMENT OP READING SKILL:

Fitts (1962) review of the research on skilled learning led him to conclude that there ere three phases in the development of any skill. These may be termed the "cognitive", "mastering", and "automaticity" phase. They occur

is that order but actually they are really one continuous process without any distinct boundary between them. Furthermore, it should be noted that, in a very complex skill such aa reading, these three phases continually recur as the learner meets each new subskill during the many years needed to become a fully skilled reader.

The initial cognitive phase is when the learner, according to Cronbach (1971, p.396), "in an unfamiliar situation must find out what to do". Thus the beginner "is getting in mind just what is to be done" (P.398). Therefore, in teaching, a skill or subskill, it is important that the task should be clearly understandable in initial stages. The usual length of this phase in adults is comparatively brief-a few hours or days - but it may be much longer in children learning to read.

In the mastering phase, learners work to perfect their performance of the skill. They practice untill they achieve a high level of accuracy with practically no errors. This stage may last for days, months or even years, depending on the complexity of the skill and opportunities for practice.

The next phase in learning a new skill is automati—city phase which comes about through overlearning (practice

beyond the point of mastery) when this is accomplished expert performers can run through the skilled behaviour effortlessly - automatically.

These three phases of skill development recur whenever some new subskill in a complex skill has to be acquired. But it is in the initial stage of learning a complex skill then a large number of new subskills must be faced all at once. Therefore, the cognitive aspect of skill acquisition is especially significant in the child's first weeks and months of reading instruction. If children fail to comprehend their reading instruction in the beginning stage, than they cannot move on to the mastering phase. They remain trapped in the cognitive phase and may lose faith in their own ability to understand what they are supposed to do in reading lessons. Prom these considerations, it becomes clear that the cognitive aspect of developing the skill of reading Is of utmost importance.

In order to develop reading skill the individual should be aware of the task. He/she should have awareness of literacy functions. Vygotsky (1934) found, in his study of school beginners in Russia, that they had only a vague idea of the purpose of written language. Reid (1966) also demonstrated that five year old beginners showed

a general lack of awareness of the purpose of written language. Downing (1970) replicated and extended Reid's study and confirmed that young beginners have difficulty in understanding the purpose of literacy.

According to Mattingly (1972) speech is a primary linguistic activity while reeding is a secondary linguistic activity dependent on the learner's awareness of the primary activity. The aspect of that primary linguistic activity which is critical in beginning reading is awareness of or "having access to" the appropriate units of one's morphophonemic representation. The argues that, although the same biologically based language-acquisition processes are used to learn both speaking and listening as well as reading and writing, the need for this access accounts for the greater difficulty involved in reading and writing.

Reading a particular orthography would involve explicit, conscious manipulation of the linguistic units which the written symbols stand for, mapping speech segments onto the characters makes it possible to decipher text into some phonetic rendering which can then be dealt with by the existing speech interpretation mechanism (Liberman et al. 1977).

That means that the learner must be able to represent speech as a succession of units at the corresponding levels, end attaining such linguistic awareness would be the main difficulty some children encounter in learning to read. Linguistic awareness is acquired as an extension of the early grammatical development which supports speaking and listening. There have been very few studies of preschool children's language awareness and none seem to have traced it's relationship to reading progress, but a large range of both correlational and training studies reviewed by Golinkoff (1978) and Rosin and Gleitman (1977) attest to the importance of the relationship of language awareness (especially phonemic awareness) and reading among school age children. In some more recent studies, it has been found that severely retarded readers, in contrast to normal readers, could not perform phonemic analysis (Fox and Routh 1980), could not do an auditory oddity task or provide a matched rhyming word ( Bardley and Bryant, 1978) and could not match appropriate graphemes end phonemes (Snowling. 1980).

SPEECH SEGMENTATION ABILITY AND LITERACY:

There is ample evidence in literature that learning to need requires that learners mast be able to represent speech

as a succession of units at the corresponding level, of all plausible loci for reading acquisition difficulties, one has in recent years drawn more attention than any other, the ability to analyse speech into phoneme-level units. The phonological awareness hypothesis has stimulated an extremely active line of developmental investigations of the ability to manipulate language at the level of submorphemic units, a group of capacities that are designated as "speech segmentation".

Phoneme segmentation ability has been shown to be significantly related to reading achievement. Liberman (1973) tested first grade children's ability to tap out number of phonemes in a word, and subsequently related their segmentation ability to scores on a word—recognition reading test administered in second grade. One half of the lowest third of the class in reeding had previously failed the phoneme segmentation test, whereas none of the subjects in the top third of the class in reeding had failed the segmentation test. Zifack (1981) too reported a highly significant relationship between the reading success of first graders and their performance on Liberman's phoneme segmentation task. Helfgot (1976) and Treiman (1976) used other methods of testing young children's ability to segment phonemes end similarly found a significant relationship between phoneme segmentation ability and reading achievements.

The greatest increase in phonemic segmentation abilities can be observed between kindergarten children and first graders (Liberman. Shahkweiler, Fischer and Carter, 1974, Rosner and Simon, 1971, Calfee, Lindamood and Lindamood, 1973). These findings led Ehri (1979) to the conclusion that "reading instruction may very well be the important factor enabling children to conduct this sort of analysis of words" (P.92).

The difficulty of phonemic tasks varies with the complexity of the operations required e.g., recognition counting, partial or full segmentation, manipulation, and reversal of phonemic units (Golinkoff, 1978, Lewkowics, 1980). The difficulty also depends on type and position of the phonemes. Continuants are easier to identify than stops (Marsh and Mineo. 1977) and phonemes in initial position easier than in terminal or middle position (Bruce, 1964, Zhurova, 1973). Initial consonants are easier to identify when followed by a vowel than by a consonant (Carver, 1967). While initial consonants seem to be more segment able, final consonants seem tobe easier to synthesize (Helfgot, 1976).

Phonemic segmentation is a difficult task doe to the nature of the acoustic signal. In speech the phonemes are not discrete units but encoded at the acoustic level

into larger units of approximately syllab Cooper, Shankweiler end Studdert, Kennedy, . Since phonemes are abstract units, phonemic a and synthesis are thus not simple associative tasks but highly demanding conceptual tasks (Helgot, 1976, Erhi, 1979) syllable segmentation is easier than phonemic segmentation (Gleitman and Rosin, 1973; Goldstein,1976; Fox and Routh, 1976).

Although phonemic segmentation may be trained in pre-school children not all children will learn it. Even after 80 trials and demonstrations, about one third of the kindergarten children in the study by Helfgott (1976) were unable to perform the segmentation of CVC words. In the study by McNeil andstone (1965) kindergarten pupils trained to identify the presence or absence of two conso-nents in meaningful words did not perform above chance level in the post test. This training was purely auditory, however the effects of phonemic training are higher when visual aide are used to represent the sound sequence (Marsh and Minco, 1977; Lewkowics and Low, 1979). Using letters to visualize the phonemic task seams to be superior to using squares (Erhi, 1984).

There is some evidence that the relationship of phonemic segmentation to reading achievement is dependent

on those components that are required in the specific reading instruction program used (Ehri, 1979 P.100). In the study by Bruce (1964), children from a school with emphasis on phonics instruction were better in a task requiring deletion of a sound from various places in a word (S-NAIL. MON-K-EY, PART-Y) than Children from a school that favoured a sight word approach.

Results presented by Treiman and Baron (1901) suggest that segmental analysis (ability to count phonemes) doe snot relate to reading ability in general but to a particular component of reading - the ability to use spelling - sound rules. Treiman end Baron differentiate two type of readers: "Phoenicians" who mainly use spelling - sound rules and "Chinese" who mainly depend on word specific associations. "Phoenicians* seem to be better at phoneme analysis than "Chinese". The direction of the casual link r mains unclear, however. Are children good at learning spelling - sound rules because they are good at segmental analysis? Or do children who know spelling - sound rules do well on phoneme analysis tests because they can Imagine the spelling of words? These is evidence both for effects of speech segmentation capacity on progress in reading and for effects of reading acquisition on speech segmentation. The relationship between

phonemic awareness and reading ability has been demonatrated by means of correlational studies, using concurrent or predictive or both kinds of correlations (Rosner and Simon, 197iy Calfee, Limdamood and Lindamood, 1973, Fox and Routh, 1975).

The nature of this relationship remains unclear. There is no direct experimental evidence to specify the statue of phonemic segmentation in the sense of a prerequisite, a facilitator, or a consequence of reading instruction. However, most of the researchers propose an interactive vies in the sense that phonological sensitivity is both a contributor and a consequence of learning to read (Goldstein, 1976, Ehri, 1979).

Evidence for the influence of speech segmentation abilities on reading has come from two types of studies. First there are magnitudnal studies showing that performance on segmentation task at one stage predict later progress in reading performance. "To interpret these data, it is of course necessary to make sure that at the time it was measures, speech segmentation ability had not yet been influenced by reading experience. The danger exists not only when the initial test of analysis ability is carried out after the start of reading instruction, but also when it takes place shortly before, at a time

when some children can receive various types of reading tution at home". (Bortelson, 1981 P.9). There are a few studies in which the contamination can probably be rules out. The best known is the monumental study by Bradly and Bryant (1983) where correlations were obtained between a test of the ability to categorise and words on the basis of sound similarity, carried out at 4 or 5 years of age. and performance on standard reeding and writing tests 3 or 4 years later. Using sophisticated partial correlation techniques. Perfetti et al (1981) have provided what looks like convincing evidence for causal influences of phone deletion and addition capacities on subsequent progress in word decoding and spelling.

The other form of evidence comes from experiments where training on some speech segmentation ability has been shown to improve reeding capacity. Bradly and Bryant (1983) studied s sub-sample of the population of their longitudnal study who had scored poorly on sound classification. These subjects were given extensive tuition on that kind of activity which enabled them to score better on the final reading tests then equally poor performers trained on semantic manipulations. The superiority, however, was significant only for children trained on both sound classification and letter - sound correspondences.

The main evidence that reading acquisition can influence speech segmantaion comes from the sudden improvement in segmentation ability that generally follows the beginning of reading instruction. Several studies have reported that this improvement is time-locked to reading instruction and not to chronological age. Segmentation ability can be shifted on the age amis when reading instruction begins one year later, as for example ia Denmark (Skjelfjord. 1976), or for the children who are older at beginning of the school year (Alegria and Morals. 1979) and it does not occur in adult illiterates who perform at the same low level es pre-school children (Moris et al. 1979). On the other hand, the improvement depends on the content of instruction: it is delayed when a whole word method rather than a phonic method is being used (Bruce, 1964, Perfetti, Beck and Kuges, 1981; Alegria et al. 1982).

Another line of evidence comes from demonstrations that orthographic knowledge is being used in speech segmentation tasks. Ehri and wilce (1979) have shown that in the phoneme counting situation, children are influenced by the number of letters in the corresponding orthographic representations they count for instance one more wait in PITCH then in RICH.

Hann (1986) describes similar tendencies in the phone counting performance of her Japanese subjects. Findings of such type of studies could be taken as simply revealing weaknesses in the testa designed for measuring phonological awareness. They might also be seen as demonstrations of changes of forms of speech processing brought about by the acquisition of literacy. They would add to a corpus of data showing for example that pronunciation is influenced by spelling (Kerek, 1976), that apparent location of extraneous noises in spoken sentences can be influenced by direction of writing (Bertelson, 1972) and that rhyming decisions concerning pairs of spoken words are influenced by their spelling (Seidenberg and Tanenhaus, 1982). The result of Brady, shankweiler and Mann (1983) that good readers are better at recognizing noise-masked speech could also imply some use of orthographic knowledge in listening to speech.

Several research groups have reported that adults who cannot read an alphabetic orthography ere unable to manipulate phonemes (Byrne and Ledee, 1983; Liberman, Rubin, Dugues and Carlisle, 1986; Moris at al. 1979; and Read at al. 1964). Thus raising the possibility that knowledge of the alphabet is essential to awareness of phonemes.

Mann (1986) studied the awareness of syllables and phonemes among Japanese and American children. This particular cross-linguistic comparison is prompted by certain differences between the English and Japanese orthographies, and by certain differences in the word games and versification devices that are available to children in the two language communities. Children in America learn to reed the English orthography, an alphabet which represents spoken language at the level of the phoneme. Whereas the Japanese children manipulate 'mora' (phonological units that are roughly equivalent to syllables) in secondary language activities. Japanese secondary language activities do not manipulate language at the level of phoneme, whereas several English secondary language activities are phoneme based, most notably the alphabetic orthography. Results of her investigation showed that first grade children in America are able to manipulate both syllables and phonemes whereas first grade children in Japan are aware of 'mora' (Phonological units roughly equivalent to syllables) but relatively few are aware of phoneme and cannot manipulate speech at phonemic level.

Marais et al. (1986) studied the effect of literacy on speech segmentation and found that illiterates are poor on deletion and detection of phonemes when compared to ex—illiterates. On the other hand illiterates perform

better on syllable deletion and rhyme detection, although still inferior to ex-illiterates, which shows that while sensitivity to rhyme and analysis into syllables can develop upto some point in the absence of the experience normally provided. by reading instruction, analysis into phonetic segments require experience with reading instruction.

The present study was aimed to study the segmentation skills in adult illiterates and literates who learns to read through syllabaries to know whether the orthography plays a role in segmentation abilities on a battery of tasks which includes rhyme recognition, phoneme additity, syllable stripping and phoneme stripping.

## METHODOLOGY

### SUBJECTS:

The subject were 20 illiterates and 20 literates adults. The age range of subjects in each group was 35-45 years. Each group consisted of equal number of males and female subjects.

The subjects in literate group had scholastic education in Hindi (Hindi language belongs to Indo—Aryan family and is spoken in northern parts of India) up to 7-10 years. All the literate subjects could read and write Hindi and had very little exposure to reading and writing in other languages particularly English.

The illiterate subjects had no schooling and if in case the subject had bean to school it was not mere than two years and his current reading ability was restricted to signing his name.

### TASK AMD PROCEDURE:

Before attempting the speech segmentation task, each subject was given a preliminary test designed to show his understanding of the terms and operations involved in speech segmentation tasks. This preliminary test compri-ses; (1) Indicating first, middle and last individual

of a group in a picture. (2) Repeating the first, middle end last of three digits spoken by the experimenter. (3) Demonstrating which, and how many blocks are left when some have been separated from others.

Every task h a s three examples with help and explanation, before beginning the proper task.

All the items in different segmentation tasks ware matched for their frequency of occurence in Hindi.

Subject's segmentation ability was tested on following 4 tasks.

1) Rhyme recognition
2) Phoneme oddity
3) Syllable striping
4) Phoneme striping

(see Appendix-I)

RHYME RECOGNITION:

Twelve pairs of words (six rhyming and six non-rhyming ) were presented by the experimenter. Subject had to state whether the pair was rhyming or non-rhyming. All the pairs were three syllabled. Non-rhyming words were prepared by mixing up the rhyming words. For eg. baniya-dhaniya(Rhyming) baniya - lakari (non-rhyming).

PHONEME ODDITY:

This task consisted of twelve test items each consisting of four two syllabled nonsense words in CVCV pattern. Of the four nonsense words in each set three had target phoneme while the last one did not have target phoneme. Ho consonant or vowel is repeated within a word. In three sets the target phoneme was in initial CVCV position. In three sets the target phoneme was in second position CVCV, While in other six sets the target phoneme was in third and final positions (CVCV and CVCV).

The task required the subjects to listen to a set of four words presented orally by the experimenter and the subject was required to point out verbally the odd one. i.e. the word which does not have target phoneme. For example lato, lepa, luka, and tena. The last word, tena, ia the odd one because it does not have target phoneme /I/ in initial position. All the items were presented randomly.

SYLLABLE STRIPPING:

This task consisted of a three syllable words in CVCVCV pattern. All the items were matched for their frequency of occurrence. The task required the subject

to repeat the remainder when one syllable is stripped. Each syllable was represented by a block. Syllable stripping was done in initial, medial and final position in each set containing three words. For example "toliva", if initial syllable is stripped then the remainder is "liya".

PHONEME STRIPPING:

This task consisted of four sub-tasks. Subtask-I consisted of six words in CVCV pattern and subject had to repeat the remainder when the initial consonant is stripped in 3 items and second consonant in remaining 3 words (dosi, when initial consonant /d/ ia stripped the response is "osi").

Sub-task-II consisted of six words having blends in $C_1$ $C_2$ VCV pattern. In three words the first consonant of the blend waa deleted and subject had to name to the remaining part of the word (premi - "remi"), while in other 3 words the second consonant $C_2$ was deleted.

Sub-task-III required the subject to name the remaining word if the consonants are deleted from the words having blends in $CVC_1C_2V$ pattern in the same way as sub-task-II. The task consisted of six words. In

words the $C_1$ was deleted while in remaining three words consonant $C_2$ was deleted. For example "patra"* when consonant $C_1$ i.e. /t/ was deleted the response should be "para" and when consonant $C_2$ is i.e. /r/ deleted from word "yatri" the response is "yati".

Sub-Task-IV consisted of three words in Which the phoneme /r/ is represented by a secondary symbol such as a ( ) or ( ) in the Hindi orthography and is not represented separately as in other words. Subject had to name the remainder whan phoneme /r/ is deleted.

All the responses were recorded by the experimenter on the data sheet (see Appendix-I) and analyze further.

## RESULTS AND DISCUSSION

The data was subjected to statistical analysis. Mean percentage of correct responses were computed for each task separately and are shown in Table-I.

### RHYME RECOGNITION:

Both the group i.e. literates and illiterates performed well on this task with mean percentage of correct response 100% and 95% respectively. There is no significant difference at p = 0.01 between both the groups (t=2.32, df=38).

### PHONEME ODDITY:

Literates performed better with 91.66% of correct response as compared to illiterates with 32.08% of correct response. There was significant difference in the performance of literates and illiterates of this task at p=0.01 level (t=15.21 df=38).

When the target phoneme was in initial position, the performance in both groups was superior. All the subjects in literate group responded cent percent whereas 70% of correct response was shown by illiterates, when the target phoneme was initial consonant in CVCV pattern. When the target phoneme was medial consonant

in CVCV pattern the performance was inferior as compared to the target phoneme in initial position. Literates subjects showed 66.33% of correct response Whereas illiterates showed 1.66% of correct response. When the target phoneme was a medial consonant.

On the other hand when target phoneme was first vowel in CVCV pattern, literates showed 85% of correct response as compared to 18.33% to illiterates when the target phoneme was final vowel in CVCV pattern the literates performed better with 96.66% of correct response as tampered to 40% correct response of illiterates.

SYLLABLE STRIPPING:

Literates performed better on syllable stripping task (99.44% correct response) as compared to illiterates (81.56% correct response). The difference between literates and illiterates was significant at p=0.01 level (t=3.80 df =38). The illiterates subjects performed better When initial and final syllable in CVCVCV pattern was deleted with 90% of correct response as compared to 63.33% correct response when medial syllable was deleted. Literates did not show any specific influence of position of syllable in deletion task with cent per cent response when syllable was deleted at initial, medial or final position.

PHONEME STRIPPING:

Both literates and illiterates performed poorer on phoneme stripping task as compared to syllable stripping with mean percentage of correct response of 45.95% and 8.09% respectively. This difference was significant at p=0.01 level (t=10.6 df=38). Influence of some orthographic features was observed in phoneme stripping task which are discussed in the next section.

INTER CORRELATIONS:

Table-II shows the correlations between different segmentation tasks in both groups. There was no significant correlation between different ssgmentation tasks except for phoneme odditity and phoneme stripping which is significant at p=0.05 level. There was no significant corelation between rhyme recognition task and other tasks such as phoneme odditity, syllable stripping and phoneme stripping. No significant co-relation was observed between the task which involved syllable segmentation end phonemic segmentation task.

Discussion:

The present study was undertaken to examine the effect of literacy on speech segmentation tasks. Speech segmentation

ability among literates and illiterates waa studied through different segmentation tasks.

The results of present investigation showed that illiterates perform poorer on phoneme odditity, syllable stripping and phoneme stripping as compared to literates subjects. These results are consistent with other studies. Marais et al. (1966) also reported that illiterates performs poorly with consonants, in both delation and detection taak. But they perform at a non-negligible level in tasks involving syllabic segmentation and also in rhyme detection.

The better performance on rhyme recognition and syllable stripping among illiterates dhows that some forms of speech manipulation are acquired upto some point spontaneously, in the absence of reading instruction, The superior performance of literate subjects as compared to illiterates on rhyme recognition and syllable stripping suggests that substantial improvement can be brought by specific training such as reading instructions. The absence of co-relation between rhyme recognition and syllable stripping suggests that they are not dependent on the same underlying competences. In other words speech segmentation abilities do not depend on prior development of a more general capacity to attend to the

sound aspects of speech. An Individual thus may be able to segment speech into syllables oven if he is not able yet to appreciate sound similarity, and vice versa.

The findings that literate subjects perform better on syllable stripping than on phoneme stripping suggest that type of reading instruction and orthography plays an important role in segmentation abilities at phonemic level. Hindi has a syllabic orthography and reading instructions during school years is through syllabic orthography. Several studies have reported that adults who cannot read an alphabetic orthography are unable to manipulate phonemes. (Byrne and Ledes, 1983) Liberman et al. 1986; Morais et al. 1979 and Read et al 1984). However, the literates are able to perform on detection and stripping tasks involving phonemes in present study which suggests that individual become aware of phonemes by age Whether or mot they have received instruction in alphabetic transcription. Mann (1986) reported that Japanese first graders could manipulate syllables but not phonemes because the Japanese orthography is syllable. On the other hand first grade children in America can more accurately manipulate both syllables and phonemes because they learn to read through alphabetic orthography.

For most children during pre—school years, awareness of phonemes may require experience with alphabetic transcription, whereas awareness of syllables may be facilitated by experience with a syllabary, but less dependent upon it. To further clarify the role of knowledge of an alphabet in children's awareness of phonemes. Mann (1986) administered counting and deletion tests to Japan are children in the later elementary grades and found that Japanese children become aware of phonemes by age whether or not they have received instruction in alphabetic transcription. "One likelihood is that awareness of both syllables and phonemes is promoted by the experience of learning 'kana', owing to the fact it is a phonological orthography" (P.87).

Placing aside the role of orthography, it is possible that phoneme awareness in literete subjects in the present study is facilitated by some exposure to alphabetic orthography because the subjects had exposure to signs, words end open small phrases in English in their day to day activities.

Thus it can be seen that awareness of syllables does not appear to depend upon reading experience as the illiterates can also delete syllables without any reading instructions whereas the ability to manipulate phonemes is markedly deficient in literates who learn to read through syllabic orthography. Thus

phonological awareness depends upon knowledge of an alphabet or phoneme which develops through reading instructions or experience with alphabetic orthography.

With reference to Hindi orthography where "Matras" is clearly visible, literate subjects performed better on those items where the target phoneme is separate from "Matra" in phoneme stripping task. For example "दोषी" where the target phoneme /d/ is deleted the correct response /osi/ waa given by 95% of subject as compared to item "नदी" (/nadil/) where most of literate subjects, gave response as /di/.

The similar tendency can also be seen in blends such as "प्याली" (/pyali/). Literate subjects showed a correct response of 90% as compared to item "प्रथा" (Pratha) (percentage of correct response 35%) where the target phoneme /r/ is clubbed along with /p/. However /p/ and /r/ can be represented separately in orthography.

Thus it can be concluded that syllable manipulation can be developed without any specific reading instruction Whereas it can be further developed by specific reading instruction. Whereas phonemic awareness requires instruction or experience with alphabetic orthography. The augmentation abilities improve with reading instructions but whether reading improves segmentation is still unanswerable and requires further investigations.

Table—I: Showing mean, SD and percentage of correct response, on different speech segmentation tasks.

| | Rhyme recognition | Phoneme oddity | Syllable stripping | Phoneme stripping |
|---|---|---|---|---|
| Illiterates | | | | |
| Mean 11.35 | 3.85 | 7.35 | 1.7 | |
| S.D. | 1.27 | 1.62 | 1.93 | 1.26 |
| % correct response. | 95% | 32.08% | 81.66% | 8.09% |
| Literates | | | | |
| Mean | 12.0 | 11.00 | 8.95 | 9.65 |
| S.D. | 0 | 1.41 | 0.21 | 3.22 |
| % correct response. | 100% | 91.66% | 99.44% | 45.95% |

Table-II: Showing intercorrelations between different segmentation tasks in literate group.

| | Rhyme recognition | Phoneme oddity | syllable stripping | Phoneme stripping |
|---|---|---|---|---|
| R.R | 0 | 0 | 0 | |
| P.O | | -0.03 | .69* | |
| S.S. | | | .23 | |

* Significant at p=0.05.

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# SPEECH SEGMENTATION ABILITY IN LITERATES AND ILLITERATES

## Data Collection Sheet

### RHYME RECOGNITION

Practice Events:-

I Hamaue - tumane

II fasala - fesala

III hamene - fasala

Test Events:- Yes - No

I dusara - tisara

II baniya - dhaniya

III. lakari- tumara

IV. kamana - samana

V. dhaniya - tisara

VI. kakari- lakari

vii chokara - chokari

VIII. hamara - samana

IX. chokari - kamana

X. hamara - tumara

XI. dusara - kakari

XII. baniya - chokari

### PHONEE ODDITY

| Practice Events:- | Target Phoneme | Response |
|---|---|---|
| melu mate pula mesi | /m/ | pula |
| pali masu tari bula | /a/ | bula |
| kula sula metu bata | /a/ | meta |
| **Test events:-** | | |
| lato lepa luka tena | /l/ | tena |
| puta pena rane pika | /p/ | rane |
| goma gipa gela tubi | /g/ | tubi |

PHONEME STRIPPING
CVCV

| Practice Ewits:- | Target Phoneme | Response |
|---|---|---|
| hani | /h/ | ani |
| lena | /l/ | ena |
| **Test Events** | | |
| dosi | /d/ | osi |
| nadi | /n/ | adi |
| chota | /ch/ | ota |
| dala | /I/ | daa |
| tabhi | /b^/ | tai |
| paya | /y/ | paa |

$C_1Cg_2VCV$

| Practice Events:- | | |
|---|---|---|
| kripa | /k/ | ripa |
| kriya | /k/ | riya |
| **Test Events** | | |
| premi | /P/ | remi |
| pratha | P/ | ratha |
| pyali | /P/ | yali |

| Practice Events | | |
|---|---|---|
| pyara | /y/ | para |
| kripa | /r/ | kipa |
| **Test Events** | | |
| pyase | /y/ | pase |
| krira | /r/ | kira |
| praja | /r/ | paja |

| Practice Events | Target phoneme | Response |
|---|---|---|
| cakra | /r/ | caka |
| takra | /r/ | taka |
| **Test Events** | | |
| yatri | /r/ | yati |
| naukri | | nauki |
| yatra | /r/ | yata |
| **Practice Events** | | |
| patni | /t/ | pani |
| katra | /t/ | kara |
| **Test Events** | | |
| patra | /t/ | para |
| chatra | /t/ | chara |
| netra | /t/ | nera |
| **Practice Events** | | |
| karma | /r/ | kama |
| varg | /r/ | vag |
| **Test Events** | | |
| nirman | /r/ | niman |
| parvat | /r/ | pavat |
| kendra | /r/ | kenda |

NAME :- AGE/SEx

OCCUPATION :-

CAN THE SUBJECT READ OR WRITE THE HINDI LANGUAGE

| | | | | | |
|---|---|---|---|---|---|
| batu | tase | kitu | nale | /a/- | kitu |
| tilu | neha | bipu | situ | /i/ | neha |
| kuna | busi | puli | rati | /u/ | rati |
| sela | kupa | tula | male | /l/ | kupa |
| nape | lupa | setu | kapu | /P/ | setu |
| meta | kute | pena | lati | /t/ | pena |
| beli | mina | pati | luki | /i/ | mina |
| tale | gasi | kule | bate | /e/ | gasi |
| katu | nelu | solu | pate | /u/ | pate |

SYLLABLE STRIPPING

| Practice Ewents:- | Target Syllable | Response |
|---|---|---|
| toliya | li | Loyas |
| pataka | pa | taka |
| nikala | la | nika |
| **Tests Events:-** | | |
| kavita | ka | vita |
| dayalu | da | yalu |
| padhare | pa | dhare |
| talasi | la | tasi |
| rupaye | pa | ruye |
| karegi | re | kargi |
| Alona | na | khilo |
| mahiia | la | mahi |
| pukara | ra | puka |