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OSMANIA PAPERS IN LINGUISTICS

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COARTICULATION IN TELUGU: INSTRUMENTAL PHONETIC EVIDENCE FOR AND AGAINST SYLLABLE AFFINITY*

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ABSTRACT

Coarticulation plays an important role in automatic sound / speech generation and in sound/ speech understanding. The coarticulation effects have large implication not only on speech technology but also in education and speech therapy / speech pathology. This paper presents an evidence of research that reflects contextual-coarticulatory influences in Telugu speech both at articulatory and acoustic levels. The coarticulatory phenomena such as (a) the influence of sound type, (b) difference in the degree of effect related to the type of sound, (c) the direction of influence (from left - to-right and Right - to- left), and (d) extent of influence (within syllable, across -syllable, across word, etc.) will be considered. The investigation is made by using suitable articulatory and acoustic instrumentation. Observations are made in relation to the place, manner, and voicing characteristics of consonants, and the lip rounding, vowel height, and tongue advancement characteristics of vowels. Apart from the empirical evidence of acoustic and articulatory modifications of vowels and consonants in different contexts of Telugu speech, variation in the duration of consonants and vowels due to contextual effects of each other, in consonant clusters, word position, etc. are also investigated. While considering segmentation strategy the assimilatory strategy (or theory) according to which segments are context dependent is also discussed.

1. INTRODUCTION

This is a pilot study which exemplifies the dynamic aspects of Telugu speech sounds by analysing experimental (i.e.

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* This paper is a revised version of an invited talk given to International Conference on Applications of Information Technology in South Asian Languages, New Delhi, 1994.

instrumental) material on (C)VC(C)V structures in terms of measurable patterns (i.e. organisational characteristics) that can be given a phonetic interpretation in terms of coarticulation and/ or word-internal coarticulatory constraints.

As stated by Gillian Brown (1977), a very slow, colloquial, formal style of speech describes the 'ideal' consonants and vowels characterised by 'target' features or properties as they might occur in isolation. In normal informal style of speech, however, certain patterns of simplification take place in every language. An act of speaking involves the simultaneous coordination of a variety of components in order to attain a series of states or target configurations which follow one another along the axis of time. States, targets, or phonemes can be sequenced according to rules. These rules may be 'coarticulatory' and/or 'phonotactic' rules, which vary from language to language.

Each segment (i.e. vowel and consonant) in a sequence may reflect the influence of the features of adjacent (preceding/ following) segments. Certain sounds become similar to or identical with adjacent sounds which process is generally termed as 'assimilation'. While some adjustments are planned, some others anticipate, perseverate, exchange or substitute. Some effects are due to at least in part to learned phonological variation (to aid communication) rather than to mechanical effects. For instance, the occurrence of denti-alveolar affricate before back vowels and palatal affricates before front vowels in Telugu cannot be attributed to phonetic contextual factors. They are extrinsically determined. Furthermore, the adaptation of segment to each other is a universal fact of human language, but the type of adaptation preferred varies from language to language.

The term coarticulation introduced by Menzerath and Lacerder has become widespread in phonetics by Swedish phonetician Ohman (1966). The phenomenon has also been called 'Similitude' by Jones (1918, 1960) and 'articulatory smoothing' by Fujimura and Lovins (1978). Coarticulation refers to the

overlap of articulatory gestures associated with separate speech segments and by extension to its acoustic effects. As a result of coarticulation, segments vary according to their contexts. Certain sounds of speech in context are influenced and altered in their pronunciation (i.e. production) by their neighbouring sounds. Coarticulatory feature-copying makes the segments involved similar to each other than they are in other contexts.

There are three primary aspects of sound influence which can be studied: (1) adaptation, (2) assimilation and (3) coarticulation (Borden and Harris, 1980). Though coarticulation refers primarily to the timing of articulation, it is sometimes used interchangeably with assimilation and adaptation, coarticulation is the cause and assimilation the effect. Coarticulation is generally linked to ease of articulation. Phonetic adaptations are variations in the ways in which articulators move and the extent to which cavities change shape, according to what phonemes are neighbours. Thus each consonant (or sequence of consonants) may adapt to their vowel environment or vice-versa.

Description of phonetic segments involves the establishment of parameters along which variation can be measured and a set of categorial values along their parameters. Most consonants are described by specifying a single oral articulatory gesture (i.e. position) together with its accompanying pharyngeal and velic gestures. But there are multiple articulatory gestures, that is, a number of types of sounds in which more than one articulatory gesture is employed. These sounds and their dynamic organisational aspects will be the topic of this paper. The importance is given to this, because speech is not just a discrete but also continuously changing acoustic stream produced by dynamic articulatory processes and this kind of study has significance for synthesis strategies as well as for general phonetic theory. Construction of an adequate universal theory of features, or phonological feature theory, will have to take into account all the phonetic categories that language employs. In addition, coarticulatory phenomenon has important perceptual uses, for

example anticipatory coarticulation may provide auditory cues which a listener can exploit to predict segments before the speaker has produced them, and preservative coarticulation can give 'carry-over' cues which usefully add to the general perceptual redundancy of the speech signal. Phonological theory and a dynamic articulatory model must have the phenomenon necessarily included in it.

In coarticulation, there is discernible degree of accommodation between the articulatory features of a given string of adjacent segments. This reflects the fact that in the neuromuscular planning and execution of speech, there is a tendency for the performance of a segment to anticipate the articulatory characteristics of one or more nearby segments yet to be pronounced. The span of this influence can be as few as two segments, or as many as all the segments in a short utterance depending on the language and context within a language. According to Laver (1994), both speakers and languages differ in the degree of coarticulatory influence exercised on adjacent segments. For instance, lingual adjustments of velar stops as these are in English in anticipation of front and back vowels are relatively small in comparison with some other European languages. For instance, in Sundanese these consonants are articulated as pre-velar, mid-velar, or post-velar according to the nature of the preceding or following vowel, with noticeably greater variation than occurs in the English k- and g- sounds in their different phonetic contexts. Another point is that, though coarticulatory influences operate over a small span of segments (i.e. neighbouring segments) resulting in the harmony process applying allophonically throughout or parts of the utterance, certain effects appear to have directional constraints. And some of the coarticulatory effects across languages are known to be universal and some others language-specific. Better understanding of speech production is the study of these influences which speech sounds in sequence have upon one another, as evidenced in acoustic and articulatory studies of individual languages.

Several researches suggest that speech perception takes place by means of context sensitive allophones such that each allophone is essentially a triple of three adjacent phonemes. Explorations of these dynamic effects are crucial to models of speech production and speech perception. Though the modification of segments in stream of speech aid speech perception, certainly cause problems for automatic speech recognition unless the knowledge or information on contextual influences of the segments is available for each language which apparently is less studied in Indian languages.

Further, coarticulation is both a phonetic phenomenon and a phonological one. It is accepted that most of the phonological descriptions of languages ignore some of the phonetic details for the sake of being able to account economically for what would otherwise be a diverse range of individual events. However, inventory of phonetic segments form the basis from which phonological rules are determined. If surface (phonetic) transcription of words does not have the details of variation in the segments recorded, the initial phonetic transcription influences the entire system of phonological rules developed by the linguist and creates a theoretical problem in defining phonetic representation. If a segment is articulatorily and auditorily different from one represented as a phonological segment which raises the question of the relationship of phonetic description to phonological one as well.

Although speech is usually described in terms of a string of invariant segmental units (phonemes), the act of speaking imposes on this string a complex encoding. The result of this encoding is observed as variation both in the production of a given phone and in its acoustic representation. Hence, this paper will be concerned with such allophonic variation as it appears at the articulatory and acoustic level specifically variations which arise from changes in phonetic context. Since coarticulation is allophonic variation of a given phone due to changes in its phonetic environment, the

production of a phone can be conditioned by a phone that either precedes it or follows it. The term anticipatory coarticulation is used here to mean the articulatory influence exercised by a segment on segments that precede it in an utterance and perseverative coarticulation for the articulatory influence exercised by a segment on segments that follow it in the utterance. The direction of coarticulatory influence of adjacent sound(s) on the target sound may be the direction of the influence of adjacent sound(s) on the target sound, thus, may be (a) Right-to-left, termed as 'anticipatory', 'forward', or 'regressive' coarticulation (the term 'coarticulation' is used here in a restricted sense of 'contextual influence' only), (b) Left-to-right, influence termed as 'perseveratory' or 'carryover', 'backward', 'retention' or 'progressive' coarticulatory-contextual influence, or (c) both directions. For example, the alveolar nasal /n/ is produced as dental nasal before and after a dental plosive which has both right-to left effect and left-to-right effect on the nasal in such examples as /bonta/ 'blanket' and /ratna/ 'name of a girl'.

To quote Fant (1993), we cannot understand the nature of speech without being aware of its dynamics. He says, success of feature work in speech synthesis by rule, in automatic speech recognition, and in the many applications to improve teaching methods in foreign languages, in deaf school training, in speech pathology, and in aids for the handicapped will depend on how well we understand the dynamics of speech production. An impressive amount of theoretical work in this direction has been developed, but we have not yet reached sufficiently high level of accuracy even for one language. All these triggered me to write this paper. It is a summary of the results of some of the experiments that were carried out to study phonetic nature of segments and the patterns of internal organisation of speech gestures within the words of Telugu.

This paper presents an evidence of research that reflects contextual coarticulatory influences in Telugu speech both at

articulatory and acoustic levels. The coarticulatory phenomenon such as (a) the influence of sound type, (b) difference in the degree of effect related to the type of sound (c) the direction of influence (from left-to-right and right-to-left), and (d) extent of influence (within syllable, across-syllable, etc.) will be considered. The investigation is made by using suitable articulatory and acoustic instrumentation. Observations are made in relation to the place, manner, and voicing characteristics of consonants, the lip rounding, vowel height, and tongue advancement for vowels. Apart from the empirical evidence of acoustic and articulatory modifications of vowels and consonants in different contexts of Telugu speech, variation in the duration of consonants and vowels due to contextual effects of each other, in consonant clusters and/or sequences etc., are also investigated while considering segmentation strategy, the assimilatory strategy, or theory according to which segments are context-dependent (for instance, nasal assimilation to stops) is also discussed.

It may be appropriate to mention here that somewhat different view of coarticulation, for instance, is that of Catford (1977). According to him and some other phoneticians, except for speech scientists and for technologists coarticulation is one particular type of simultaneous (as opposed to successive) modifications of articulation of the same segment. Thus, articulatory modification is distinguished from coarticulation. Catford means simultaneous articulation in more than one articulatory area (for example, oral and nasal) or more than one articulatory zone (for example, labial and velar). He further distinguishes two kinds of coarticulation namely, coordinate coarticulation (e.g. double articulation) and secondary coarticulation (e.g. labialization, dentalization, etc.,) and two types of modification namely, duration and tenseness which needs a separate study on its own. Catford gives some attention to differences in the nature of coarticulation. According to the locational relations between pairs of articulators, we can have any two articulators as being (1) heterorganic (when they involve quite distinct articulators, moved independently of

each other), (2) homorganic (if they involve exactly the same articulators) and (3) contiguous (if they involve adjacent articulatory zones). Extent to which each consonant may adopt to its neighbouring (i.e. immediate) consonant in sequence may depend on the nature of the types, mentioned above.

Although these different relations have important effects on articulatory processes, both in sequences and in coarticulation, due to time constraints only certain influences of consonants and vowels on each other in both directions is considered in detail in this paper to look into their mutual influences and (segmental) organisation (programming), intersegmental coordination, coarticulation and syllable organisation. The organisation and coordination of these articulatory events used in speech production, depend on the use of adequate instrumentation. Hence, I have used the techniques like Palatography, Sound Spectrography and Electrokymography depending on the type of sound segment or sequence under investigation. Palatographic technique is particularly appropriate for the study of the exact place of articulation of both retroflex and velar consonant articulations in different vowel contexts under study, and it gives information specifically about the degree of contact between the tongue and the palate. Spectrographic technique is found useful to study the format structure of vowels adjacent to retroflex consonants. Kymographic technique was used for the study of nasalisation of vowels adjacent to nasal consonants under investigation. The data was controlled for each study of the phenomenon of coarticulatory modification of the segments under study.

2. INFLUENCE OF ADJACENT VOWELS ON VELAR CONSONANT

As has been discussed, a given consonant unit is found to have different places of articulation in the environment of different vowels. This point is mostly illustrated with examples of velar consonants, particularly plosives. A striking point in such descriptions of velar plosives is that the point of contact almost

described as being dependent on the nature of the following vowel. Examples of accounts of this feature include Jones (1972), Ladefoged (1975), Hardcastle (1981), Gimson (1970), Pike (1947) and others. Accounts of some of the Indian languages also describe velar plosives as being influenced by the following vowel only. For example, see the studies based on palatographic evidence given by Nihalani for Sindhi, (1974) by Balasubramanian (1972) and Firth (1934) for Tamil and Dave (1970) for Gujarati.

Descriptions of Telugu, with one exception, (i.e. Kostic et al, 1977) do not include any statements regarding the realisation or modification of velar plosives. Even in Kostic et al, though the phrase 'adjacent vowel' is used, the explanation is oriented only towards the influence of the following vowel (1977:83-84).

A set of palatograms of Telugu words containing velar plosives (for details of data, see Nagamma Reddy, 1981), spoken by the author (and verified by other speakers of Telugu), was made by the method of direct palatography used in the Phonetics Laboratory of the University of Edinburgh (details of the technique, and the interpretation of the data, its problems and uses can be found in Nagamma Reddy (1981:149-161) and Brown (1977:82-91).

All palatograms of velar plosives used in the investigation show no obvious difference in the place of articulation of voiced and voiceless consonants. This is in sharp contrast with the findings of Anonymous Author (1918:30), who reports such a difference between /k/ and /g/. He describes the voiced consonant as having a fronter place of articulation than the corresponding voiceless one and describes /g/ as pre-velar and /k/ as post-velar. The vowel context, on the other hand, does have a clear bearing on the place of articulation of velar plosives. As far as the utterance-initial velar plosives are concerned, the results agree with the findings in the literature discussed earlier, in that a velar consonant followed by a front vowel is fronter than one followed by a back vowel.

The same is the case with intervocalic consonants which are not preceded by a front vowel: for example, the /k/ in /baaki/ 'debt' is fronter than the /k/ in /baaku/ 'dagger'. However, this cannot be extended to a generalisation covering all occurrences of intervocalic velar plosives. This is because a velar plosive followed by a back vowel is not necessarily back, if the preceding vowel is front. The palatograms of /piika/ 'whistle', /pikka/ 'calf of leg' and /inka/ 'still' illustrate this point very clearly. In each case the vowel following the velar plosive is back, but the contact for the plosive is in the palatal and post-palatal zones. From this, one can only conclude that the velar plosives are fronted under the influence of a preceding front vowel. A somewhat similar type of fronting has been observed for colloquial Tamil. (see Asher, 1982), Similar examples can be found in Malayalam. But in these languages there is a morpheme boundary before /kk/. Therefore, the findings in these languages are not entirely parallel to the Telugu examples discussed in this paper.

For Telugu, velars on the basis of palatographic evidence can only be analysed in terms of the following four complex environments:

1. Followed by and preceded by a front vowel.

2. Followed by a front vowel and preceded by a back vowel.

3. Followed by a back vowel and preceded by a front vowel.

4. Followed by and preceded by a back vowel.

It is possible to summarise the position with regard to the exact place of articulation of 'velar' consonants in Telugu by giving the following articulatory labels:

(a) Velar or post velar articulation when between back vowels (environment (4) above)

(b) Palato-velar or mid-velar articulation when preceded by a back vowel and followed by a front vowel (environment (2))

(c) Palatal or pre-velar articulation when between front vowels or when preceded by a front vowel (environments (1) and (3)).

3. INFLUENCE OF RETROFLEX CONSONANT ON VOWELS AND VICE VERSA

The retroflexion of vowels in Telugu is also a phonetic phenomenon, it occurs only when the vowels occur before a retroflex consonant (for details of instrumental records and discussion, see Nagamma Reddy, 1984). It is obligatorily anticipatory. If we compare, for instance, the first vowel in */paata/* 'old' and */paaṭa/* 'song', it differs in quality in that the same vowel is characterised by a retroflex colour and centralisation before retroflex consonant than before a dental consonant. The vowel */aa/* in */paaṭa/* involves anticipatory coarticulation. Once the retroflex consonant closure is released, the tongue is in no more retroflex shape and hence the following vowel is not retroflexed.

The place of articulation of a retroflex plosive, however, varies depending on the nature of the following or preceding vowel. When adjacent to a front vowel retroflex plosive is articulated somewhat forward and when adjacent to back vowel some what backward in its place of contact (see for details palatographic study of retroflex consonant by Nagamma Reddy, 1984). When the retroflex plosive is followed or preceded by a retroflex nasal consonant, it is articulated still relatively backer in the mouth.

The exact place of articulation of retroflex consonants is somewhat controversial as they seem to differ from one language to another. However, within the same language also (Telugu in this case) the place of articulation of a retroflex consonant varies a great deal. The results of the palatographic study of retroflex consonants in Telugu support Fujimura et al. (1973) whose 'studies indicated that the articulatory condition for the same phoneme varies depending on the phonetic context'. But this in Telugu raises certain problems with regard to the question of syllable-division in that the single consonant is taken as belonging to the same

syllable as the following vowel. When there is a tendency in Telugu for the consonaçt to be articulated fronter even if it is followed by a back vowel (in the examples such as /*pii ʈa*/ 'wooden seat' and /*pii ɖa*/ 'evil') makes it difficult to reconcile this view with a commonly expressed view on coarticulation, according to which, 'coarticulåtory effects are said to be maximal within an articulatory syllable and minimal between successive syllables' (Hardcastle, 1981).

4. INFLUENCE OF NASAL CONSONANT ON VOWELS

The nasalisation of vowels in Telugu discussed in detail with kymographic evidence in Nagamma Reddy (1991) is a phonetic phenomenon. It occurs only when the vowels are adjacent to a nasal consonant, either left-to-right direction from nasal to vowel (as examplified below), or from right-to-left (for instance word or syllable ending with a nasal as in /*andam*/ 'beauty') or both directions depending on the phonological structure of a word. The first vowel /*aa*/ in /*maamu*/ 'tree' is more nasalised than the same vowel in /*aame*/'she' and no nasalisation at all for the same vowel in /*taanu*/ 'he/she'. The heaviest nasalisation is when the vowel is both preceded and followed by a nasal consonant as in /*maamu*/ 'tree'. The phenomenon of vowel nasalisation in Telugu is quite different from Hindi (Ohala, 1975/1983), Kelkar (1968) also states that there is a greater or stronger nasalisation of a vowel before a nasal consonant than after (Nagamma Reddy, 1991), where the vowel in /*kaan*/ 'ear' and /*naam*/ 'name' has about the same amount of nasalisation but in /*naak*/ 'nose' less than those two in Hindi, which is quite different in Telugu. The nasalisation of a vowel is, thus determined differently by its language specific rules in Hindi and Telugu even when the environment remains the same, as explained above. The vowel nasalisation is a sort of intersegmental coarticulation.

The quality of the nasalised vowels also differs from their corresponding oral vowels in that the nasalised vowel /*a*/, for

instance, is somewhat raised and centralised than the same oral vowel. Though Telugu exhibits both anticipatory and perseveratory nasalisation of vowels, the latter is obligatory and the former is optional. For details of measurements and the kymographic study of nasalisation of vowels in Telugu, see Nagamma Reddy, (1991).

5. COARTICULATION IN RELATION TO SYLLABLE-BOUNDARY

Instrumental phonetic study of velar and retroflex plosives adjacent to different vowels confirm the statements made earlier by some scholars that a given consonant or vowel may be influenced differently by its nature of articulation. This point although illustrated mostly in general phonetic theory with velar consonant, the retroflex plosive is also functions quite similar to velar if its place of articulation is taken into consideration. But the overall generalisation that the velar consonant place is influenced by the nature of the following vowel is quite contrary as the preceding vowel can also condition the consonant variation in Telugu. In this language we can only generalise the tendency that both velars and retroflexes when surrounded by back vowels are articulated further back and when surrounded by front vowels are articulated further forward. This effect of retroflex consonant on the preceding vowel in terms of (F2 raising and F3 lowering) raises certain problems with the question of syllable division. According to Hardcastle (1981) coarticulatory effects are maximal within an articulatory syllable and minimal between successive syllables. This may be a fact of nasal consonant and the vowel. The plosive consonant on the contrary, for instance lengthens the preceding nasal which is an indication of anticipatory coarticulatory influence between the nasal and plosive sequence that occurs across the syllables.

However, the syllable boundary does block the regressive assimilation (i.e. coarticulatory effect) in certain examples like /pani/ 'work' and /paṇʈa/ 'crop'. Among the homorganic nasal plus plosive sequences, the nasal consonant is phonologically assigned to the preceding vowel, but there may not be any effect of nasal on the preceding vowel. In some examples such as

/*mooham*/ 'lust' etc., the nasalisation spreads throughout the utterance (including) which indicates that coarticulatory influence could exist between more than one segment.

The effect of retroflex consonant on the preceding vowel than on the following vowel also indicates that coarticulation phenomenon does not respect the rules of syllable boundary. This agrees with Hockett (1955) who states within words there is no actual 'point of syllable division', though Malmberg (1995) appears to be one of the few scholars who have sought a phonetic basis for determining syllable division. The precise division of an utterance into syllables on a phonetic basis nevertheless remains a problem, though certain factors, for instance the duration of segments sometimes functions as a clue to the syllable boundary as discussed in the following examples.

5.1 INFLUENCE OF CONSONANT SEQUENCES/CLUSTERS ON VOWELS

In Telugu, vowels before consonant sequences (including geminates) are consistently short in duration as it is common with most languages. There is, a shortening of vowels before a sequence of consonants in which the first consonant in the sequence closes the syllable. Maddieson (1985) suggests, vowel reduction in closed syllables could be used as a phonetic cue for syllable division which infact is the case with Telugu.

5.2 INFLUENCE OF PLOSIVE CONSONANT VOICING ON NASALS

Contrary to vowel, the nasal consonant before a voiced plosive is considerably at least one and a half to two times longer than the same nasal occurring elsewhere in Telugu. This lengthening of nasal before a voiced plosive could be regarded as a clue to syllable boundary. But it is the voiced consonant syllabified with the following vowel is the one that is affecting the preceding nasal. The nasal preceding voiced plosive also causes reduction in the duration of a following voiced plosive. The influence of nasal on the following voiced consonant and vice versa exhibits

compensatory lengthening or shortening between the segments across the syllables. Thus the articulatory coarticulatory effect is seen between the segments occurring across the syllables as well.

Coarticulatory effects of adjacent sounds can be clearly noticed from the spectrograms of, for instance, /aasti/ 'wealth' where the /s/ is influenced by dental articulation of a plosive and hence the noise frequency spreads below its range to 3000 Hz (if we compare spectrograms of /s/ in /sarita/ 'name of a girl' and /aasti/). Among the fricatives the /s/ generally shows variation in the cut off noise at low frequencies, due to its adaptation and coarticulation with neighbouring vowels. Spectral characteristics are modified due to coarticulatory effects of adjacent sounds, especially by front vs back vowels. It has lower distribution of acoustic energy when compared to /s/, and /ʂ/ shows still lower frequency noise than the /s/. The /h/ is always characterised by the formant like bands in the lower frequency region resemblance to the specific quality of adjacent vowel formant pattern. Some times /s/ and /ʂ / also have formant like structure seen on spectrograms of /mooham(u)/ 'love' and /dooʂam(u)/ 'fault'. The duration of fricative also changes depending upon the immediate segment type. For example, /s/ in /waasu/ 'name of a boy' is much shorter than the same /s/ in /waastu/ 'traditional science of construction'. This phenomenon of consonant being lengthened (rather than shortened) in consonant sequence than in isolation is quite contrary to initial clusters (see Haggard, 1973, and Klatt, 1976). In Telugu, the first consonant in a sequence of two consonants in word-medial position tends to be lengthened (Nagamma Reddy, 1993). The lengthening at first consonant in sequence of two consonants may also function as a cue to syllabification.

It was found that the length of the preceding vowel is influenced by the length of the following plosive and its phonation type (i.e. aspirated or unaspirated). Other things being equal, a vowel tends to be shortest before voiceless aspirated and longest

before voiced unaspirated. There is, thus, an interaction between phonation type and vowel duration in Telugu (cf. the spectrographic evidence provided in Nagamma Reddy (1992).

5.3. INFLUENCE OF POST-CONSONANTAL VOWEL ON PRE-CONSONANTAL VOWEL (VOWEL- TO-VOWEL COARTICULATION ACROSS SYLLABLES)

One other phenomenon affecting the quality of vowels in Telugu is the one generally referred to as 'vowel harmony' (see for instance Kelley, 1959). The way in which this phenomenon is taken account of in a phonological description depends largely on the nature of the unit taken as a basis for that description. If only isolated monomorphemic words are taken as the basis, the different vowel qualities resulting from vowel harmony can be handled under the heading of allophonic variation or coarticulation across syllables. If, however, phrases are taken as the basis and a comparison made between minimal pairs, one or both members of which is a phrase (as was done by Kelley, 1959; and Sivarammurthy, 1968), it is necessary to set up additional vowel phonemes (for examples and details see Nagamma Reddy, 1981).

A short or long vowel, when followed by /a/ in the next syllable is more open than when followed by a close vowel in the next syllable. There is furthermore a difference depending on whether the close vowel in the following syllable is front or back. A vowel followed by /i/ in the next syllable is somewhat fronter than the same vowel followed by /a/. This can be seen on the spectrograms made for an illustration of a difference in quality of one particular vowel /a/ (which is the case with all other types of vowels) in three different environments. The (first) vowel /a/ followed by /i/, /u/ and /a/ in the next syllable in the words /paʈʈi/ 'having held' /paʈʈu/ 'silk' and /paʈʈa/ 'bark' shows the following approximate measurements of the formant frequencies of F1, F2, and F3:

	F1	F2	F3
/a/ followed by /i/	700	1500	2250
/a/ followed by /u/	600	1250	2550
/a/ followed by /a/	720	1300	2300

These figures indicate the general tendencies of vowels to vary slightly in quality depending on the nature of the vowel in the next immediate syllable. A fully meaningful explanation of these variations, however, would be possible if only one looks at a large number of samples and an account of all the environmental factors that might be relevant.

The formant frequencies of the same vowel differs when followed by front vs back or close vs open vowel. /a/ followed by /i/ in the next syllable is somewhat fronter, and /a/ followed by /u/ is somewhat backer, and /a/ followed by /a/ is relatively open, between central and back. These differences in the quality of a vowel, depending on the openness or closeness of the vowel and also frontness or backness of the vowel in the following syllable, vary further according to the vowel height and backness of the first vowel (i.e. a vowel in the preceding syllable).

These variations in vowel quality in Telugu that are outlined earlier elsewhere in detail (Nagamma Reddy, 1981) may be satisfactorily explained in terms of coarticulatory effects of post-consonantal vowels on pre-consonantal vowels. It was shown, for example, by Ohman (1965:39-151) that 'the variability observed in transition movements from the first vowel to the intervocalic consonant would be predicted by the formant frequencies of the second vowel' (see Bell and Hooper, 1978:123). It should, however, be noted that such coarticulatory effects are restricted to tongue position and may not involve other articulatory features, such as nasalisation and lip rounding in such example as /tanu/ 'he or she', the preconsonantal /a/ is raised, but not nasalised or rounded, though the postconsonantal /u/ is not

only a close vowel but also has the features of nasalisation and rounding. It may be worthwhile investigating these differences in vowel quality in terms of 'Articulatory Setting' (cf. Honikman, 1964:73; Laver, 1994) which will enable us to distinguish segments which are perceptible to the influence of a given setting, and those which are non-susceptible, because of their pre-emptive articulatory requirements' (Laver, 1979:32).

9. CONCLUDING REMARKS

There are two basic types of modification that occur in the contextual coarticulatory processes in Telugu: (a) Feature Spread in which the inherent features of one sound are modified by adjacent sound involving the same articulator or different articulators so that they become alike or identical for instance, lip rounding of /p/ or the retroflexion of /uu/ in /puuṭa/ 'portion of a day'; (b) Feature Reduction where the primary articulation may not reach its target position or the target location. It may shift under the influence of adjacent sounds. For example, the velar plosive /k/ in /baaki/ 'debt'. Telugu provides another important evidence of such shift in /k/ even in the examples, for instance /piika/ 'whistle' compared to same /k/ in /paaka/ 'hut' where we do not expect such a shift since /k/ is syllabified with a following back vowel in both the words under comparison. Both regressive and progressive phenomenon of such speech sounds in Telugu (i.e. velar plosives) is apparently different from other Indian languages. Telugu, thus, shows bidirectional influence of the same consonant in the specific context. We do not find such a phenomenon occurring in most of the languages. We find in Telugu in general anticipatory coarticulatory influence of velar and retroflex consonants and perseveratory coarticulation effects of nasal consonant. Vowel harmony (i.e. vowel copying feature within the words) has right-to-left effect in Telugu as an anticipatory coarticulation within the monomorphemic lexicon.

The velar plosive is articulatorily and auditorily different from the one represented as a phonological segment which raises the

question of phonetic description to phonological one. The velar is articulated as prevelar in /kii ḍu/ 'harm' mid-velar in /kaa ḍi/ 'yoke' and post-velar in /kaa ḍu/ 'he will not be'. Palatalisation of velar after a front vowel even followed by a back vowel is more salient auditorily, therefore, linguistic description of Telugu speech should take that into account. As found by Lisker (1978), the timing of the phonetic features involved in coarticulatory action does not respect segmental boundaries. The articulatory features spread across more than one segment as well as syllable or across syllables. For example, the retroflex setting can cross the syllable. Because the vowel followed by retroflex consonant is retroflexed than the vowel preceded by a retroflex consonant to which it is assigned as a syllable.

The segmental domain of coarticulatory effects tend to vary with the type of segment involved. There is, thus, in general in Telugu an anticipatory effect of retroflex consonant, perseveratory effect of nasal consonant and both anticipatory and perseveratory effect of velar consonant. The direction of influence depends on the presence or absence of a front vowel. Front vowel has stronger influence over the consonants place than the other non-front vowels.

This study reveals that the dynamics of speech is equally essential as static segments in order to understand the nature of speech. And the adaptation of segment to each other confines to some extent to universal fact of human language, but the type of adaptation preferred varies from segment type to segment. There is more anticipation than perseveration of the effect in certain languages, but in Telugu speech there is just as much perseveration as anticipation. One must explore further all aspects of coarticulatory phenomenon of all segments and sequence of segments and the direction of influence in the development of dynamic articulatory (theoretical) model as such which allows continuity of movements subject to rules of contextual reorganised coarticulation and reductions. This kind of study has significance

for speech synthesis and speech recognition in general and to Telugu in particular. It has important perceptual uses as mentioned above. Phonological theory and the theoretical models must have the coarticulatory phenomenon necessarily included in them. Inspite of its importance, multiple articulatory gestures and their organisational aspects have not been so far described or discussed for any of the Indian languages. Construction of universal theory of features or any phonological theory will have to take into account all these phonetic modifications of the phonological segments (i.e. categories) that language employs. This paper is a brief account of such phenomenon and much remains and needs to be investigated.

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COMPREHENSION AND NAMING OF OBJECTS AMONG ADULT HINDI APHASICS

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ABSTRACT

Naming of objects and their comprehension was analysed (using Western Aphasia Battery (W.A.B. Hindi Version) and "semantic categories test in Hindi") among five fluent and two non-fluent aphasics- - Broca's -- 2, Wernicke's -- 2,Transcortical Sensory Aphasia's (T.S.A.) --2, Anomic -- 1. Speech errors in these two tasks were analyzed into various categories. Dissociations were found in comprehension and naming of objects. Frequency phenomena, which suggests less frequent objects in a language are more difficult to name, was illustrated / explained. The question whether aphasic naming is disordered due to damage to semantic representations or damage to lexical retrieval system was discussed.

1. INTRODUCTION

This paper examines the errors made in comprehension and naming of objects (kitchen utensils) among Hindi speaking fluent and non-fluent aphasic adults. Aphasia is a disorder in language, which manifests both among adults and children. It results into partial or complete disruption of language functions due to damage to various parts of brain. Non-fluent aphasics have mostly non-fluent speech (with short phrases), whereas fluent asphasics have very fluent, but ungrammatical speech. Aphasic patients manifest differential performance levels for various aspects of linguistic function. For instance, non-fluent aphasics have loss of function words in their speech, whereas simple nouns and verbs remain relatively spared. Non-fluent aphasics have lesions anterior to the Rolandic fissure, while fluent aphasics have lesions posterior to it.

Disturbances of naming and comprehension are common after insult to immature, adult and aging brain. They are mostly related to those conditions of Central Nervous System (C.N.S.) damage, which result in Aphasia. Following are some of the major debates and studies on comprehension and naming deficit among aphasics. Neilson (1936) reported one brain damaged case, who could recognize inanimate objects, but who had little difficulty with animate objects. Goodglass et al (1968) found that major diagnostic subdivisions of aphasics (Broca's, Mixed Transcortical Aphasia (MT.A.,) Global, Wernicke's Conduction, Transcortical sensory aphasia, anomics) do not differ consistently in their comprehension of grammatical discriminations. Although language production is quite dissimilar in these aphasics, they appear to have a similar comprehension defect. This discrepancy suggests that the mechanism, of a production deficiency cannot be completely the same mechanism as that which is responsible for the comprehension deficiency. Pizzamigilo and Appliciafuoco (1971) did not find any evidence of a specific impairment in the semantic comprehension of object names among Broca's and Wernicke's aphasics as compared to the phonetic and the syntactic ones. Yamadori and Albert's (1973) observation with individual aphasics shows that they had selective difficulty in comprehending colour names and the names of indoor objects. Heilman and Scholes (1976) investigated, to what extent the comprehensional ability of aphasics may be differentially affected by the impairment of the lexical or syntactic component of their linguistic competence. They found that wernicke's aphasics made significantly more lexical errors than Broca's, conduction and controls. There were no significant differences between Broca's and conduction aphasics. However, both these groups made more syntactic errors than the controls. Warrington et al's (1983) patient's comprehension of names of foods and living things was selectively impaired relative to object names. Another aphasic retained selectively better comprehension of food and animal names than of other objects in general. Zurif (1984) concluded that

asyntactic comprehension in agrammatic aphasia results from an impaired ability to make syntactic interpretations that depend upon closed class items (function words and grammatical inflections), while the similar deficits in fluent aphasia are due to a misassignment of lexical items to phrasal role positions. (e.g. subject, object). Hart, Berndt and Caramazza's (1985) case showed a naming deficit limited primarily to the names of fruits and vegetables. Kremin (1986) compared naming and comprehension in 40 aphasics and found in two of them, nearly perfect naming in the presence of poor comprehension in lexical semantic tasks. Silveri and Colosimo (1995) studied a mixed transcortical aphasic and found that he presented a clear dissociation between ability in naming and difficulties in performing word - picture matching tasks. They suggested that the dissociation between naming and comprehension could be an expression of a computational limitation within the processes involved in word - picture matching, due to the competition for limited processing resources by automatically activated hyperactive naming. They also concluded that such a dissociation occurs only in transcortical aphasics.

2. OBJECTIVES

The data reported in this paper are taken from the author's doctoral thesis, which discusses the comprehension and naming errors in Broca's, Wernicke's, Anomic, Transcortical Sensory aphasics in various paradigmatic and syntagmatic semantic categories in Hindi. This study aims at investigating the nature of comprehension and naming tasks among them. It also examines, whether the aphasics have naming errors due to problems in lexical retrieval or problems in semantic representation. It further aims at observing, whether the recovery patterns among aphasics are consistent or inconsistent. Finally, its purpose is to prepare a remedial program at semantic level for aphasics.

3. METHODOLOGY

a) Subjects

The study was carried out at M.Y. Hospital, Indore, Madhya Pradesh (M.P.), King George Medical School, Lucknow, Uttar Pradesh, (U.P.), All India Institute of Medical Sciences (A.I.I.M.S.) and G.B. Pant Hospital, New Delhi in India. Five fluent and two non-fluent aphasics formed part of the study. (abbreviated as S,T,R,M, L,P,K). Fluent group included two Wernicke's (S,T), two Transcortical sensory aphasics (R,M), one anomic aphasic (L) whereas non-fluent group consisted of two Broca's aphasics (P,K). All these aphasics had brain damage due to Cerebro-Vascular-Accident (C.V.A.) resulting into right side hemiplegia or paralysis of right upper and lower limbs. C.V.A. resulted from thrombosis, embolism or thrombo-embolitic clots among them. The time of evaluation among these aphasics ranges from less than 20 days to one year 4 months post onset stroke. They were in the age range 30 - 70. Anomic aphasic was a female. Rest were all males. Besides this, Wernicke's Aphasic- T was a left-hander. All others were right handers. Following table summarizes the information about the subjects.

Table - A

Patient	Sex	Age	E.Q.	Occupation	Clinical type	Handedness	Mothertongue (Dialect)
T	M	72	Inter	Salesman	Wernicke's	L.H.	Hindi (Avadhi)
L	F	55	10th	Tailor	Anomic	R.H.	Hindi (Malvi)
R	M	70	10th	Monk	Transcortical Sensory Aphasia	R.H.	Hindi (Malvi)
P	M	35	10th	Businessman	Broca's	R.H.	Hindi (Bangru)
M	M	56	B.A.	Computer Operator	Transcortical Sensory Aphasia	R.H.	Hindi (Bangru)
K	m	59	B.A.	Accountant	Broca's	R.H.	Hindi (Malvi)
S	M	48	M.E.	Electrical Engineer	Wernicke's	R.H.	Hindi (Malvi)

All the subjects were literate Hindi speakers. Hindi is a South-Asian language of Indo-Aryan family. It is the official language of Indian Union, as well as many of its States - Himachal Pradesh, (H.P.) Haryana, Rajasthan, U.P., M.P. and Bihar. It is also used as an instrument for literature writing in these States, as well as Punjab, Maharashtra and Gujarat. Besides this, it is the Lingua Franca of 15 Crore Indians as well as immigrant Indians in countries like Nepal, Fiji, Guyana, Surinam and Trinidad. According to structure, Hindi can be subdivided in to three sub branches - (1) Western Hindi, which comprises Bangru, Khadiboli, Urdu, Bundeli, Braj spoken mainly in Delhi, U.P., Haryana, Rajasthan and M.P., (2) Eastern Hindi, consists of Avadhi spoken in U.P., (3) Central Hindi includes Chhatisgarhi and Malvi spoken in M.P.

b) Test Administration

To ensure that the aphasics were immune to colour - blindness, they were administered "*ishihara* colour blindness test" developed by Japanese Opthomologist -Shinobu Ishihara in 1978. It is a test of colour vision, using a series of plates, in which, there are printed round dots in a variety of colours and patterns. It assesses red-green and yellow-blue deficiency among subjects. People with normal colour vision are able to discern specific numbers or patterns on the plates. The inability to pick out a given number or shape is symptomatic of a specific deficiency in colour perception. This test was administered to aphasics, in order to rule out a defective vision for colours, so that they are able to perceive coloured objects clearly. Further, the aphasics of present study were diagnosed on the basis of neurological findings obtained from a neurologist, their C.T. scan reports and clinical findings based on Western Aphasia Battery (Hindi version). (This battery was originally developed by Andrew Kertesz in 1982. Its Hindi version was developed by Speech and Hearing unit, All India Institute of Medical Sciences (A.I.I.M.S.), New Delhi, under an Indian Council of Medical

Research (I.C.M.R.) project at All India Institute of Speech and Hearing (A.I.I.S.H.), Mysore in 1989. It was used to diagnose the clinical categories of aphasia). All the aphasics were found neurologically stable. None of them had undergone speech therapy. Later, "Semantic categories test in Hindi" was administered to them in three recorded sessions, with an interval of one month between two sessions. (The test contains subtests on (a) paradigmatic semantic categories - colour terms, object naming, kinship terms and lexical categories (fruits, vegetables, trees, months, days of the week, numerals) and (b) Syntagmatic semantic categories - syntagmatic Synonymy-Homonymy-Antonymy, case relations, verbs of motion and cooking related activities, semantically anomalous sentences). This test was developed by the investigator to check what sort of comprehension and naming errors aphasics have in various semantic categories.

c) Procedures and Materials

A set of 11 coloured plastic objects representing kitchen utensils was used as an experimental tool. They included - *cup, glass, jug, ketli* 'kettle', *channi* 'sieve', *patiilaa* 'cauldren', *thaali* 'saucer', *katori* 'bowl', *garvi* ' a water pot with a spout', *bottle, baalti* 'bucket'. Naming of these objects was tested by showing the patient an object (one at a time) and asking "what is this?" (confrontation naming). In case the patient did not succeed in naming an object, a semantic cue was provided e.g.   Target object : kettle.

Semantic Cue : It is used for pouring tea in cups. (Inverse naming).

Comprehension was assessed in the following way: The investigator named an object and asked the patient to point out, where the corresponding object is in a set of stimuli present before him/her. (Visual confrontation naming).

4. RESULTS AND DISCUSSION

Following are the findings and their analysis in various tasks.

1.   Confrontation naming: The Following types of naming errors were found in this task among aphasics of present study.

A. Semantic Paraphasias

The term semantic paraphasis is used to designate aphasic transformation in which the target and substituted words belong to the same semantic field. They are of following types.

i)   Semantically related

e.g. 1. *channi* 'sieve' ⟶ *chalni* 'sieve' (Broca's)

2. *channi* 'sieve' ⟶ *caashni* 'syrup' (T.S.A.'S)

3. *channi* 'sieve' ⟶ *ketlimor* 'kettle hole' (Anomic)

4. *thaali* 'saucer' ⟶ *choti ginni* 'small bowl'

(Wernicke's)

A componential analysis of these semantic paraphasias indicates that all the aphasics based their name selection of objects on a common semantic feature - container, filter etc., in most of the instances. However, in all these instances, the target object and named ones, both have different functional contexts. e.g. The target object *channi* 'sieve' is used for filtering tea, whereas named ones - *chalni* 'sieve' *caashni* 'syrup' and *ketlimor* 'kettle hole' are used for filtering flour, sugar coated liquids and tea leaves respectively [1,2,3,]. Similarly, the target kitchen object *thaali* 'saucer'- in Wernicke's aphasic T's naming is a food container and the named object - *choti ginni* 'small bowl' is a container for curry. His name selection also indicates that he has substituted a partial relation for the whole, since *ginni* is part of a food container namely *thaali* (4).

ii) Semantically Unrelated

5.   *jag.* 'jug' ⟶ *mithaa bhataa* 'sweet rice'- (T.S.A.'s)

6.   *botal* 'bottle' ⟶ *ladaai jahaaz* ' of warship' - (T.S.A.'s)

These semantic confusions reveal that T.S.A. aphasic -R could not comprehend the target objects - *jag* 'jug' and *botal* 'bottle' and thus named semantically unrelated and vague objects.

iii) Functional Associate

7.   *kap* 'cup' ⟶ *pilet* 'plate' - [T.S.A.'S]

8.   *channi* 'sieve' ⟶ *kulhad* ' a mud pot for taking tea' - [T.S.A.'S]

9.   *baalti* 'bucket' ⟶ *paani gilaas* ' a glass of water' - (Wernicke's)

The target object and named one's were functional associates in T.S.A.'S naming in two instances and in one instance in Broca's and Wernicke's naming.

iv)   Collocation

The phenomena of collocation was found only in one instance in Wernicke's aphasics for object names

10.   *patilaa* 'cauldron' ⟶ *kali* 'tinned'. In this instance, Wernicke's aphasic - T knew that *patilaa* 'cauldron' is tinned, but could not name it.

B) Circumlocutions

When a subject is asked to name an object, due to word finding difficulty, instead of naming the object, he names only its attributes or functions, the responses are known as circumlocutions.

11.   *gilaas* 'glass' ⟶ *caay par* 'on tea' - (Broca's -)

12.   *kap* 'cup' ⟶ *caay ki* 'of tea' - (Broca's-K)

13.   *botal* 'bottle' ⟶ *davaa, davaai* 'medicine'-(Anomic-L)

14.   *botal* 'bottle' ⟶ *davaa, davaai* 'medicine' - (T.S.A. 's-M) (Wernicke's -S)

15.   *baalti* 'bucket' ⟶ *paani pite hain*

'we drink water (from it)' - (T.S.A.'s-R)

Broca's, Wernicke's and T.S.A. 's had moderate number of circumlocutions. They were semantically related to the target object. These circumlocutions reflect aphasics' failure in semantic representations for certain objects. By circumlocuting these objects, Aphasics have linguistically compensated for their access difficulty.

C) Neologisms

Neologisms are linguistic segments, which are used as words, even though they do not appear in the dictionary of a given language community and cannot be related to any conceivable target word on the basis of either sound or meaning.

16.   *thaali* 'saucer' ⟶ *caarpaan* -(Broca's -K)

17.   *botal* 'bottle' ⟶ *caarlu*

18.   *katori* 'bowl' ⟶ *yaajir* - (T.S.A. 's-R)

19.   *ketli* 'kettle' ⟶ *tharad* - (T.S.A.'s -M)

20.   *gilaas* 'glass' ⟶ *doecki* - (Anomic -L)

Neologisms were found in the naming of Broca's, anomic aphasic and transcortical sensory aphasics. They point to the failure in lexical search for above mentioned objects among these aphasics.

D) Phonemic Paraphasias

Phonemic paraphasias result from the transformation of a specific word of the language, a word usually chosen correctly by the aphasic, but transformed phonemically.

21. *ketli* 'kettle' ⟶ *etli* - (Broca's)

22. *katori* 'bowl' ⟶ *tatori* (Broca's)

23. *thaali* 'dish' ⟶ *shipli* - (T.S.A.'s)

24. *patilaa* 'cauldron' ⟶ *tapeli* - (Anomic)

25. *kap* 'cup' ⟶ *pic* - (Wernicke's)

Phonemic paraphasias were prevalent among all the aphasics of this study. They point to failure in phonemic execution of certain objects in aphasic's speech in certain instances.

E) Empty Speech

When aphasic's speech lacks meaningful and substantive words, it is described as empty speech. It is difficult to understand due to overuse of high frequency, low content words -'thing', 'it', 'be', 'have', this' etc.

26. *jag* 'jug' ⟶ *ye to* ------'this is ----' - (T.S.A.'S)

27. *channi* 'sieve' ⟶ *isko kahte hain* --- 'we call this --'

Empty speech errors were found only in the confrontation naming of Transcortical sensory aphasics and Wernicke's. They reflect aphasics failure in lexical search.

F) Stereotypic Errors

While responding to a number of objects, when the patient comes out with a set of similar responses for all of them, the responses are known as Automatisms or stereotypic errors. These errors were common to only Broca's aphasic - K. They refer to his severe word finding difficulty.

28. *kap* 'cup' ⟶ *kamaar*

29. *gilaas* 'glass' ⟶ *chotari*

30. *ketli* 'kettle' ⟶ *chotari*

31. *botal* 'bottle' ⟶ *chotari*

Williams and Canter (1982) observed that Broca's aphasics performed significantly better in naming objects on a confrontation naming task, than on a picture description task. In contrast, the Wernicke's aphasics performed significantly better on the picture description task. Anomic and conduction aphasics did not display a consistent pattern of differences on this task. Pauranik (1996-97) studied 40 right handed Hindi speaking aphasics (non -fluent aphasics -Broca's -13, Global -5, T.M.A. 's -3, aphasics (non - fluent aphasics -Broca's -13, Global -5, T.M.A.'s -3, Fluent aphasics -Wernicke's -6, Conduction -5, T.S.A. 's-3 and anomics -5). He observed that fluent aphasics had significantly greater propensity to produce paraphasias, while it was less marked in non-fluent aphasics. Semantic jargon was not produced by Broca's and transcortical motor aphasics. Broca's aphasics had mostly phonemic paraphasias, while fluent aphasics produced semantic ones. No significant difference in number of different types of paraphasias in relation to age was found. Female patient produced significantly more semantic paraphasias. Present study replicates Pauranik's observations regarding paraphasias in fluent and non-fluent aphasics. Goodglass et al (1998) studied naming errors in 30 aphasics (Broca's -10, Wernicke's -6, Conduction -7, Anomics-7) in object -picture naming task. Naming errors observed in their corpus were -semantic paraphasias, (related and unrelated to the target stimulus), neologisms, circumlocutions, empty speech, naming part for whole. This study reflects the same type of naming errors, except naming part for whole.

L Frequency Phenomena

garvi ' a water pot, with a spout' and *baalti* 'bucket' were among the most difficult objects to name for Broca's and anomic aphasic whereas - *ketli* 'kettle', *channi* ' 'sieve' and *katori* 'bowl'

had the same function for Wernicke's aphasics. Similarly, *ketli* ' kettle', *garvi* 'a water pot with a spout' and *baalti* 'bucket' were most difficult to name for T.S.A.'s; While *garvi* and *ketli* have lowest frequency of occurrence in Hindi and thus they are difficult to name, no inference can be drawn regarding other objects. According to Rochford and Williams (1962), different objects present consistently different degrees of difficulty for aphasics and object naming task raises general problems of the organization and retrieval from the 'cerebral word store' in a specific form. Present study replicates Rochford and William's observation regarding different degrees of difficulty for object names among aphasics.

II. Inverse Naming

In this task, the patient was explained the function or attribute of an object and then asked to name it. Following are the types of errors found in inverse naming of various aphasic groups.

a. Broca's - Semantic Paraphasias, circumlocutions, phonemic paraphasias, stereotypic errors.

b. Wernicke's - Semantic paraphasias, circumlocutions, neologisms (a solitary instance), empty speech.

c. Transcortical Sensory Aphasic's

    Semantic paraphasias, phonemic paraphasias, empty speech, neologisms.

d. Anomic Aphasic - Semantic paraphasias.

In most of the instances in this task, aphasics of present study named objects, which were semantically related to the target object inherent in semantic cues, but their functional context was different. However, there were also exceptions, where Wernicke's and T.S.A. 's named the objects, which were semantically unrelated to the target object inherent in semantic cue.

32. *jisme khaanaa khaate hain* ⟶ *kap* - (Wernicke's)
    'one in which we take meals' 'cup'

33. *jisme davaai daalte hain* ⟶ *gilaas-*
    'one in which we pour medicine 'glass'

⟶ *davaat*
'inkpot'

⟶ *ketli*
'kettle'

The name selection of Wernicke's and T.S.A. 's can be justified only on the basis of named objects and objects inherent in semantic cues, both being containers. Otherwise, they reflect that aphasics couldnot comprehend the functions of objects inherent in semantic cues. However, functions indicated by circumlocutions were semantically related to the object inherent in the semantic cue among Broca's, Wernicke's and T.S.A.'s. Self-correction by Anomic aphasic-L indicates that the response intended by semantic clue - gilaas 'glass' was already in her lexical repertoire, but before naming it, she substituted another object - baalti 'bucket' and then corrected herself. This may be probably due to failure in lexical selection for an appropriate object.

III) Visual Confrontation Naming

In this modality, which involved comprehension of objects, the investigator named a particular object and asked the patient to indicate it among the objects presented before him. Following error pattern was noticed among the aphasics in this modality.

a)   Indicative Substitution Errors

When the patient or subject substitutes one object for the other in the course of pointing out an object, the resulting error is known as Indicative Substitution Error.

34.   *katori* 'saucer' --> *jag* 'jug' - (Broca's -K)

35.   *jag* 'jug' --> *ketli* 'kettle' - (T.S.A. 's -R, Anomic -L)

In visual confrontation naming of objects, Broca's had a mean percentage score of 90.9 (P) and 81.8(K); Wernicke's - o(T) and 3.03(S); T.S.A.'s - 90.9(R) and 81.8 (M); Anomic - 84.8 9L). It indicates that Broca's, anomic and T.S.A.'s comprehension for object names (kitchen utensils) was preserved to a great extent, whereas Wernicke's was severely impaired. Further, in confrontation naming of objects, Broca's had a score of 48.3(p) and 3.03(K), Wernicke's - O(T) and S (2.7), T.S.A.'s -24.2(R) and 45.4 (M) and anomic - 69.8 (L). This shows that name comprehension for objects was much better than name production in all the aphasics, except wernicke's. Wernicke's were severely and equally impaired in name production and name comprehension in object naming as compared to other aphasics.

For computing differences in comprehension and naming of objects, Mann -Whitney U-Test was employed. It indicated a significant level of .41. Since this level is much higher than the desired one, we can say that aphasics comprehension for object names was significantly preserved than their naming.

As far as dissociations between naming and comprehension of objects are concerned, they once again show the pattern reflected in Goodglass et al's (1986) study, where aphasics were unable to name certain objects, but could recognize them, when their names were spoken.

In the present study, there were large number of instances, where patients could comprehend an object but could not name it. (See Table 1 -1) [Here the numbers indicate the number of objects, which were either comprehended or named by aphasics. Total No. of objects -11. Total score -II]

	Could comprehend / but not			Could name, but not Comprehend		
	I	II	III	I	II	III
Broca's -P	7	4	4	0	0	0
Broca's -K	8	8	10	0	0	0
Wernicke's -S	8	10	9	0	0	0
Wernicke's -T	11			0		
T.S.A. 's -r	6	10	7	1	0	0
T.S.A.'s-m	8	6	6	0	0	0
Anomic-L	7	6	2	1	0	1

As far as recovery patterns are concerned, they were inconsistent in most of the cases among aphasics.

5. CONCLUSION

Dissociations were found in comprehension and naming of objects among all the aphasics. The target object and named one were functional associates in the naming of T.S.A.'s, Broca's and collocation was found among Wernicke's aphasics. Broca's and anomics comprehension for object names was preserved to a great extent. Aphasics naming difficulties were both due to the inability to use semantic representations to select the correct name as well as inability to retrieve any phonological information about the target. Broca's and anomics reflected more representation, whereas wernicke's and T.S.A.'s had severe deficit in semantic representation and less deficit in name production and name comprehension in object naming as compared to other aphasics. Besides this, circumlocutions, neologisms, semantic paraphasias, were also noticed among the aphasics.

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LANGUAGE ISSUES IN TELUGU IN THE CONTEXT OF MULTIDIALECTAL SITUATION

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ABSTRACT

Telugu, one of the Dravidian languages, shows regional as well as social variations. In addition to this a particular dialect was chosen for writing purposes. Choice of a particular variety for the written purposes lead to language movement. Consequently colloquial dialect of educated speakers of coastal dialect gained importance and was being used for writing purposes. Since some change has been observed in this regard this paper explains the relative importance of different dialects at different points of time in the history of Telugu and focusses upon the language issues that the speakers of Telangana have been encountering.

1. INTRODUCTION

Telugu, one of the literary languages of Dravidian family is spoken mainly in Andhra Pradesh. At present there are four regional dialects in Telugu (Krishnamurti, 1979). North (Telangana), Southern (Rayalaseema), Eastern (Srikakulam, Visakhapatnam), Central (Krishna, Guntur, East and West Godavari districts). The variety widely used in newspapers, text books, television, radio and fiction is based on the speech of the educated middle and upper classes of central Andhra Pradesh. Rest of the social dialects and regional dialects are confined only to non formal situations and are considered as non standard variety.

In this paper an attempt is made to look at the present language situation from historical perspective in the context of different socio cultural situations that have been existing which helps us to understand the present trends in the language situation of Telangana region and its implications in different dominions.

2. HISTORICAL BACKGROUND OF PRESENT LANGUAGE SITUATION

The attestations of this language are available to us right from 6th century onwards in prose form. Inscriptions on poetic form are available from 9th century A.D. Both in prose and poetry the variety used for writing was different from colloquial spoken variety right from pre-Nannaya's period itself. This phenomenon was continued till the beginning of the 20th century. Prior to 20th century itself, changes were found in the language in the sense that borrowed words and lexical items from spoken dialects were used. Since 16th century onwards, quite a number of prose writings have come up. In these works colloquial language was used. The British rule also had its impact on the language situation. During British regime introduction of printing technology made education accessible to a large number of people. Biblical literature was in colloquial dialect. British Parliament has passed charter act according to which Church missionary society is to be established and education is to be imparted through vernaculars. As a result, a college was established in Madras in which department of Telugu was also found. Some of the British administrators showed keen interest in Telugu and started writing in Telugu of which Meckunzie *kaifiats*, Telugu grammars by Campbell and Brown's are of significance. A text book society was established which has brought out several publications on different non literary aspects. To cite a few *Kasiyaatra Caritra* by Enugula Veeraswamy, George Beer's World geography, Arden's Telugu grammar etc. Colloquial language was used in these publications till Paravastu Cinnayasuri became the president in 1848. Some Telugu scholars like Kandukuri Veeresalingam, Gidugu Venkata Rama Murthy were staunch supporters of the colloquial language and wrote in this variety. In this way *Vyavahaarikoodyama* started in 1910. There

were lengthy discussions between the supporters of *Granthika* (literary dialect) and *vyaavaharika* (colloquial dialect) each placing their own arguments. The advocates of classical language based their arguments on the following grounds.

1. There is absolutely no change in the classical language from Nannaya period to Kandukuri.

2. There was absolute uniformity in the classical language.

3. There are no grammatical rules for the colloquial language.

Gidugu Ramamurthi, the staunch supporter of *Vyavaharika* followed every language movement the world over from the *Calit bhasha* one in Bengal spearheaded by Rabindranath Tagore to the distant Norwegian controversy between the proponents of *laandsmal* and *ricksmal*. His main arguments were as follows (Radhakrishna, 1993). 1. Any literacy language in its classical form and style shall not be the medium of instruction since it is nobody's mother tongue, especially when literacy is no longer the privilege of a few and where the need of the hour is disseminating modern scientific knowledge to one and all. (ii) Classical language varieties cannot be employed in text books and in literary works since no scholar however conversent he may be with old started in 1910. There were lengthy discussions between the supporters of *Granthika* (Literary dialect) and *Vyavahaarika* (colloquial dialect) each placing their own arguments. The advocates of classical language based their arguments on the following grounds.

i. There is absolutely no change in the classical language from Nannaya period to Kandukuri.

ii. There was absolute uniformity in the classical langage literature can handle it correctly, efficiently and purposefully. He did not agree that there should be single standard for a living language. (iii) It is necessary to produce literature in various genres and text books in several disciplines in the

modern standard form of the language which is not different from the educated speech of the times.

Kandukuri was very much impressed with his scholarship and arguments placed that he has established an association for the propagation of Modern Telugu. In 1933 Modern Telugu was recommended unanimously to be the medium of instruction. In 1936 a new and vigorous literary association *Navya Sahitya Parishattu* (Modern Telugu Akademi) was established at Guntur which started a literary magazine, *Pratibha* to propagate the reformist views. Tapi Dharma Rao, editor of *Janavani*, a Telugu daily, introduced for the first time modern Telugu in Journalism in 1938. All literary domains with the exception of a few classicalist poems and text books continued to be in modern Telugu.

The colloquial modern Telugu which they referred was based on the spoken dialect of the educated class of coastal districts (Krishna and Godavari districts). Since this area is said to be forward educationally as well as economically and many literary scholars participated in this language movement happened to be from this region, the dialect spoken by the educated class of this region acquired the status of standard language.

3. STATUS OF TELUGU IN TELANGANA REGION

Telangana region was under the rule of Nizam for a period of 4 centuries 14th to 18th century. Persian was official language during Qutub Shahis (1518-1720), later it was replaced by Urdu during the rule of Asafjahis, who ruled the land with Hyderabad city as capital. Besides Urdu and Telugu, Kannada, Marathi speakers were also found in the region because parts of Karnataka and Maharashtra were also included in the erstwhile Hyderabad State. Though numerically Telugu speakers were more in number, when the study of extent

of bilingualism was carried out, it was observed that more number of people learnt Urdu as second language apart from their mother tongue over a decade of time. During 1931-41 the number of people knowing Urdu increased rapidly. The reason being the patronage it had received officially. It was used in different dominions, education, mass media, public platforms, official correspondence and court. State policy of education was in favour of opening Persian and Urdu schools in each taluk and district headquarters. Osmania University was established during 1918 A.D. in which Urdu was the medium of instruction. An ordinance was issued by seventh Nizam in 1923 to the effect that no private schools (Khangi) including *viidhiba lļu* (where Telugu was taught) can be opened up. Thus the opportunities to study Telugu were further curtailed. They were not interested in the purchasing of books in Telugu to the libraries.

There was a drastic change in the above mentioned situation as a result of the establishment of *Andhrajana Sangham* at a crux period. A group of Telugu speakers walked out of the meeting in 1921 at Vivek Vardhini college as a protest because Telugu speakers were not allowed to continue their speech in Telugu and on the very same day Andhrajana Sangham was formed. Under this banner they have chalked out certain programmes. 1. To establish schools and libraries 2. Collection of manuscripts and Telugu inscriptions, 3. Evolving a system to conduct exams and work for the spread of language. As a result of the untiring efforts of these great people a school was established to impart education through Telugu as medium of education in 1928. Newspapers in Telugu were started. Andhra Saraswatha Parishat was established in 1943 and started conducting *Prathama, Madhyama, Visarada* exams in Telugu. Public meetings were conducted in Telugu. As a result of this language revolution, Telugu could gain some importance in this region.

When the speakers of this region had the opportunity to

use their language on formal occasions and writing purposes apart from the informal situations they wanted to differentiate between the written language and spoken language, as Khubchandani (1981, p.22) points out that "In every day verbal communication one notices enormous fluidity and diversity of codes dealing with informal situations whereas in the formal situations particularly in the written form one demands compartmentalised `appropriate' and correct usage according to the professed dictum, one or more socially favoured styles of verbal communication". The Telangana dialect speakers have chosen a variety which is closer to literary dialect with which they were familiar. Krishnamurti (1976 p.7) pointed out "The regional variation obtaining in the speech of the educated is accepted in writing and it is mostly in the area of morphology and lexicon and marginally in phonology. e.g. past tense *inaa* (Rayalaseema) *æ* (Coastal dialect). Though Telangana writers used *inaa*, it is not found in the educated class of this region. In their spoken dialect it is *in* only. *inaa* which they used is not from the spoken dialect of Rayalaseema. They were using a variety which is closer to literary dialect with which they were familiar in order to keep distance between spoken variety and written variety. Later gradually this written variety of Telangana was replaced by the colloquial spoken dialect of educated class belonging to Coastal Andhra. This particular dialect was being used in education, newspapers, formal situations. Therefore, there is a gap in Telangana region between the spoken and written language unlike the coastal region. This sort of phenomenon has serious implications in the domain of education, literacy programmes public communication programme.

4. PRESENT SITUATION IN TELANGANA REGION

Andhra Pradesh State was formed on November 1, 1956 by bringing Telangana districts of the erstwhile Hyderabad State, coastal districts, areas of Rayalaseema under one State

jurisdiction with Hyderabad city as capital. In this sort of environment also since text book writers, editors of news papers, cine producers belonged to coastal region, they used the colloquial spoken variety of the coastal educated class in their respective dominions. Moreover, the dialect of this region was ridiculed over mass media like T.V., movies by using it for the characters of either unsocial elements or jokers.

This sort of phenomenon resulted in social identity crises. The educated class of this region started reacting to the prevailing situation. Therefore, some Telangana writers who are scholars in Telugu literature started using Telangana dialect in formal situations too i.e., speeches on public platform, and writing articles in the magazines. Resentment is being expressed through articles towards the attitudes of the coastal people towards Telangana dialect. Some people have expressed how they were finding it difficult to learn the coastal dialect used in text books (Nandini Sidda Reddy, 1998) Research studies carried out in some of the schools of Hyderabad also prove the same (Swarajya Lakshmi, 1995).

The postgraduate students of this region who have studied text books during their formal educational curriculum written in coastal dialect use Telangana dialect in their answer scripts. Students organisations too make use of their native dialect to propagate their ideologies. In the context of increased number of educated people from this region, they have developed confidence to use their dialect. Some Telangana speakers raise objection to the usage of this dialect on formal occasions. However this trend of using Telangana dialect cannot be controlled and need not be controlled. Opponents of this trend base their arguments on uniformity and purity. The use of Telangana dialect in different dominions can be encouraged on the following grounds.

1.   In the field of education and literacy programmes, it is easier to impart knowledge through one's own dialect.

2.   It boosts up the confidence of the speakers.

3.   The distance between different dialect speakers arising out of language identity issue can be reduced.

4.   The staunch advocate of vyavaharika movement Gidugu also pointed out that no single standard language can be determined to a living language.

5.   The same arguments based on which vyavaharika movement was successful can be applied to the present phenomenon too. The following diagram shows the relative positions of different dialects in question in Telugu land at different points of time.

	Prior to 19th century	Since 20th century
High variety	*graanthika*	*vyaavahaarika*
	(literary dialect)	(Based on spoken dialect of educated class of coastal districts)
Low variety	*vyaavahaarika*	
	(Based on spoken dialect of educated class of coastal district)	Other dialects

The above diagram shows that any dialect may acquire the status of high variety depending upon the socio-cultural situation.

5. CONCLUSION

1.   Telangana dialect though is said to be one of the dialects of Telugu as any other dialect like coastal variety on synchronic level,

historical development of these two differ because of sociocultural reasons.

2.   By the time coastal dialect acquired the status of written variety, Telangana dialect was at the stage of 'struggle for existence'.

3.   The elite of the society at that time who constituted a small group therefore have chosen the readily available literary dialect with slight modifications for written purposes.

4.   After the formation of Andhra Pradesh State, coastal dialect was imposed upon the natives of this region.

5.   With the emergence of widespread educated class in this region, people have started reacting to this situation. As a result, the use of Telangana dialect in different dominions is on the increase.

6.   Even in formal situations both the dialects are competing with each other. If congenial environment is provided, there is every chance for this dialect to emerge as a standard dialect. "Insistence on accepting the diction prevailing among the elite for the rest of the community often makes native speakers `alien' `handicapped' in their own surroundings. It disables them to cope with even simple communication needs because of the new values and norms proclaimed for their speech behaviour especially in the domains of public communication, administration, education, mass media etc. (Khubchandani, 1981: 28-29).

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AGREEMENT IN TELUGU BROCA'S APHASICS*

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ABSTRACT

This paper presents preliminary results pertaining to the agreement pattern in Telugu Broca's aphasics. The results of the paper are discussed in the light of the findings made in Hebrew and Italian aphasics where the agreement is preserved, whereas it is disturbed in Telugu and Hindi aphasics. The reason for relative and intact agreement in Italian and Hebrew aphasics and disturbed agreement in Telugu and Hindi aphasics is explained by the morphological distinction in the languages.

1. INTRODUCTION

Grodzinsky's (1984) work demonstrated that for structural reasons, certain kinds of closed class items and inflectional markers cannot be omitted by agrammatic aphasics. He illustrated this point using Hebrew data. Hebrew agrammatics therefore tend to substitute rather than omit grammatical morphemes.

Grodzinsky experiments with a Hebrew aphasic who displays agreement inflection to be completely intact. Italian is a highly inflected language. DeBleser and Luzzati (1994) reported, based on an experimental task, that the data elicited from Italian agrammatics showed preserved verbal agreement.

Subash Bhatnagar (1990) reports agrammatic disturbances in a Hindi speaking broca's aphasic. The aphasic either deletes the entire verb form or occasionally drops the verb inflections while retaining the verb in its root form or produced the verb in its uninflected infinitival form.

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The present paper describes the results based on a preliminary analysis of the agreement pattern in Broca's aphasics whose native language is Telugu, a language belonging to the Dravidian family spoken predominantly in parts of South India. Telugu shows subject-verb agreement. Telugu verb agrees in Person, Number and Gender features of the subject. It shows a three way pronominal distinction like I, II and IIIp. III P.f. impolite and IIIp.neut.sg show the same form. Plural III P, m and f show the same form. All these personal pronouns have their PNG suffixes which appear on the finite verb. Following are the examples to show the agreement pattern in Telugu:

a. *neenu*   *paṇḍu*   *tinnaanu*
    I   fruit   eat+past+PNG
    'I ate the fruit'

b. *nuwwu*   *paṇḍu*   *tinnaawu*
    you   fruit   eat+past+PNG
    'You ate the fruit'

c. *waaḍu*   *paṇḍu*   *tinnaaḍu*
    he   fruit   eat+past+PNG
    'He ate the fruit'

d. *aame*   *paṇḍu*   *tinnadi*
    she   fruit   eat+past+PNG
    'She ate the fruit'

e. *waḷḷu*   *paṇḷḷu*   *tinnaaru*
    they   fruits   eat+past+PNG
    'They ate the fruit'

f. *manamu*   *paḷḷu*   *tinnaamu*
    we   fruits   eat+past+PNG
    'We ate the fruit'

g. *naalugu*   *gaajulu*
    four   bangles
    'Four bangles'

2. METHODOLOGY

Subjects: The two subjects who participated in this study were taken from the Gandhi hospital, Secunderabad.   A neurophysician at the hospital reported that they had brain damage resulting from a Cerebro Vascular Accident (C.V.A.) due to thrombosis which caused right hemiplegia in each case. The brain scan reports of the two subjects confirmed that the damage is confined primarily to the Broca's area in the left hemisphere.   Important subject information has been summarized in Table 1.

Table 1: Subject Information

Patients	Sex	Age	Education	Occupation	Etiology	Diagnosis
M	M	25	Intermediate	Carpenter	C.V.A.	Broca's Aphasia
A	M	35	10th class	Clerk	C.V.A.	Broca's Aphasia

An assessment format was designed to elicit essential components of phonology, morphology and syntax of Telugu language as part of Usha Rani (1986) study.   Word lists and sentence lists were made to elicit data for different inflectional categories.

3. DATA ELICITATION

Since the two subjects lacked spontaneous speech, data could not be elicited consistently using conversation and interview methods.   The main technique used for much of the data collected was repetition and correction task.   Repetition is a well-known technique used in studies involving aphasics. Entire data on morphology and syntax sections were elicited through repetition.

The first recording of each subject was made approximately four weeks after the stroke.   The subsequent two recordings were made at intervals of one month each.

The data were recorded using a cassette tape recorder and transcribed by the experimenter. The data discussed in this paper were taken from all three recordings with a view to examine the recovery pattern in each case.

4. TASKS

For the present paper both imitation and correction task were administered to the subjects. In the imitation task simple structures e.g. (1) and conjoined structures e.g. (2) were given to the subjects for repetition.

e.g:

1. *neemu   waccænu*
   I   come+past+PNG

   'I came'

2. *meekaa kukkaa   pillii   aaɖukuŋʈunnaayi*
   goat   dog   cat   play+pres+prog+pl+PNG
   'The goat, the dog and the cat are playing'

In the correction task structures involved were like quantifier + N + V e.g. (3) and pronominal subject + V e.g. (4). were given to the subjects for repetition.

3. **naalugu gaaju   unnadi*
    four   bangle   be+past+sg

4. **waḷḷu   waccæɖu*
    they   come+past+III+sg+mas+non-hon.

All the structures were ungrammatical where either the quantifier does not agree with the noun in number or verb does not agree in PNG features with the pronominal subject. The correction task has been explained by the investigator. The ungrammatical sentences were uttered by the investigator one by one. The subjects had to correct the sentences by producing them.

5. RESULTS

Table-1 presents the subject information. Tables II and III illustrate the responses to the imitation task. T- stands for target sentence given by the investigator to the subject. A and M are the initials of the subjects. I, II and III are the three recordings of the subject's responses to see the recovery pattern.

Imperatives and negative structures were repeated by the subjects without any distortion like:

I. Imitation task:

(a) Imperative structure

   1.   *akkaḍa*   *kuuco*
       there   sit
       'Sit there'

(b) Negative structure

   2.   *neenu + raaleedu*
       I   come+past+not
       'I did not come'

Table II: Construction type   N   +   V
subject

Target sentence(T)3		*waaḍu* he	*tinn-aa-ḍu* eat+past+iii.masc.sg.
A	I	correct response (CR)	
	II	CR	
	III	CR	
M	I	**waaḍu* he	*tinn-aa-nu* eat+past+I.sg.
	II	**waaḍu*	*tinn-aa-nu*
	III	CR	

Table III: Conjoined structure

T	4	*neenu-u*	*amma-a*	*akka-a*	*sinimaa-ku*	*we ǁ-æ-mu*
		I -conj	mother-conj	sister-conj	movie -dat	go+past+I.pl.
		'I, my mother and my sister went to the movie'				
	I	*akka*	*tinnam*	*well-æ-*	ø	
		sister	movie	go+past	Agr	
A	II	*amma*	*sinima*	*well-æ-*	ø	
	III	CR				
M	I	*neenu*	*akka*	ø		
		I	sister			
	II	*neenu*	*amma*	ø		
		I	mother			
	III	*neenu*	*amma*	ø		
		I	mother			

Table II and III show the responses of the simple structure and conjoined structure of the imitation task. Subject 'A' could repeat sentence 3 i.e. N+V structure in all the recordings correctly whereas he had problem with sentence 4 i.e. conjoined structure. The response to the sentence 4 very clearly shows that one of the NPs was omitted and the verb does not agree in number with the plural subject in I and II recordings. In the third recording his response was correct.

Subject M had problem with both the sentences 3 and 4. In sentence 3, the verb does not agree in gender and person with the subject. In sentence 4, only two nouns were repeated. The third noun along with verb + PNG inflection was deleted.

TABLE IV/ QUANTIFIER+ N +V PNG				
T		5	6	7
		*muuḍu puwwu-ø unnawi three flower are+III.neut.+pl. three flower are there	*oka gooli unnawi one marble are+III.neut.pl. one marble are there	*naalugu gaaju-ø unnadi four bangle is÷III.neut.sg. four bangle is there
	I	Not Correct (NC)	NC	NC
A	II	muuḍu puulu unnawi three flowers are+III.neut.+pl.	NC	NC
	III	muuḍu puulu unnawi three flowers are+III.neut.+pl.	oka goli unnadi	NC
	I	NC	NC	NC
M	II	NC	NC	NC
	III	muuḍu puwwulu unnayi	oka goli unnadi	NC

TABLE V : CONSTRUCTION TYPE PRONOMINAL SUBJECT + V					
		8	9	10	11
	T	*neenu wastaru I Come+fut.+III.pl.	*waaḷḷu waccæḍu *they come+P+III.masc.sg.	*aame wastaaḍu *she come+fut.+III.masc.sg.	*adi wastaaru she / it come+fut.+III.neut.pl
	I	NC	NC	NC	NC
A	II	NC	NC	NC	NC
	III	NC	NC	NC	NC
	I	NC	NC	NC	NC
M	II	NC	NC	NC	NC
	III	neenu wastaanu I Come+fut.+I.sg.	neenu wastaanu I come+fut.+I.sg.	NC	adi wastundi She/ it Come+fut.+III.Neut.sg.

Tables IV and V belong to the correction task. Table IV shows that subject 'A' does not correct the sentences 5, 6 and 7 in the I recording. Sentence 5 is corrected in II and III recordings while 6 is corrected only in the third recording i.e., the noun agrees with the quantifier in number.

Subject 'M' does not correct sentences 5 and 6 in the I and II recordings. Sentence 7 is not corrected in all the recordings. 5 and 6 are corrected in the third recording, i.e. the noun agrees with the quantifier in number.

Table V clearly shows that subject A could not correct all the structures in all the recordings.

Subject 'M' shows some correction only in the third recording. The correction is like this: In sentence 8, the verb agrees with the subject in person and number. In sentence 9 the pronominal subject is changed to first person singular from plural subject and the verb agrees with the subject. Sentence 10 is not corrected even in the third recording. In sentence 11 the subject corrects the sentence where the verb agrees with the pronominal subject in person and number.

6. CONCLUSION

The results of the imitation task show that the problem is with the conjoined structures with three nouns where the verb has to agree with Ip. plural subject compared to the simple structure. The reason may be the length of the sentence which is always a problem for aphasics to process and the complexity involved in the verb to agree with the I plural subject which can be substantiated by the developmental data reported by Sailaja (1997) which shows Ip. pl agreement marker is always acquired late by Telugu children.

Coming to the correction task the correction of the ungrammatical sentences in the third recording for some structure shows that the subjects realized the ungrammaticality.

Distance was playing a role in the correction task. The subjects have not corrected the structure where the verb had to agree with the pronominal subject which is across the constituent, whereas they corrected some structures where the noun agrees with the quantifier which is within the constituent. Agreement within the constituent is more intact compared to across the constituent.

The reason for relative and intact agreement in Italian and Hebrew may be explained by the rich inflectional morphology and the morphological distinction in both the languages made by Grodzinsky. In Italian, major lexical items are morphologically, but not phonologically dependent on the inflection, i.e., an uninflected element is possible, but is a non-word and in Hebrew a word is dependent both phonologically and morphologically on the inflection i.e., an uninflected item is not only a non-word but also an illegal phonological string whereas in Telugu lexical items may have existence independent of inflections which might be the reason for disturbed agreement in Telugu speaking aphasics.

Hindi-speaking aphasics also show disturbance in agreement like converting finite verbs into non-finite which substantiates the impairment of agreement in Telugu aphasics from language point of view like both are agglutinative and verb final languages.

Time adverbials are deleted by all the Telugu aphasics. This may be because they are redundant in the language.

Repetition of imperatives and negative structures by Telugu speaking aphasics do not show any distortion may be because there is no agreement in these structures.

The data utilized for the present analysis is taken from the author's Ph.D. work.

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TWO NOTES ON INDO-ARYAN

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A. INDO-ARYAN STUDIES

Languages may be studied either synchronically or diachronically, the latter comprising both historical and comparative. The European scholars concentrated on comparative studies while historical studies received the attention of the Indian scholars. We may make here a few statements summarizing these studies involving Indo-Aryan languages.

The modern comparative Indo-Aryan studies can be said to date from the publication of John Beames' *Comparative Grammar of the Modern Aryan languages of India* which appeared in three volumes, dated 1872, 1875, and 1879. The study is mostly limited to the seven languages, viz. Hindi, Panjabi, Sindhi, Gujarati, Marathi, Oriya, and Bengali, but there are occasional references to Assamese, Kashmiri and Nepalese, and the third volume has fairly extensive reference to the Gypsy language. The comparative grammar does not try to reconstruct a Proto Indo-Aryan from the modern languages but it does state the development of the various Indo-Aryan languages from Sanskrit. All the languages are considered as developing through a series of stages, agglutinative, synthetic (or inflectional) and analytic. The Indo-Aryan languages are, then, classified according to their stage of development, with Hindi being the most progressive language since it is the most analytical, followed in order by Panjabi, Gujarati, Sindhi, Marathi, Bengali and Oriya (I. 48-54).

The next major step in Comparative Indo-Aryan was the publication of Sir George Grierson's *Linguistic Survey of India*. This appeared in 11 volumes from 1903 to 1928. Roman Volumes 5-9 treating the Indo-Aryan languages. Grierson splits the Indo-Iranian into an Indo-Aryan branch and an Iranian branch, the latter subsequently splitting into two branches, Iranian and Dardic. The Indo-Aryan family Grierson subdivides into an Outer branch and an Inner branch, the Inner branch including western Hindi, Panjabi, Rajasthani and Gujarati. The Outer branch includes the other Indo-Aryan languages with the exception of Eastern Hindi which is placed midway between the Outer and the Inner branches. For the determination of the relationship of the Outer and Inner branches, Grierson uses typological, morphological and phonological criteria.

The later comprehensive study of Comparative Indo-Aryan to date is Jules Bloch: *L' indo-aryen du veda aus temps moderne* in 1933. Turner, in his review, says "no Indianist, whether comparativist or not, can afford to be without it". Much of the subsequent work has been an attempt to study minor problems that were not solved by Bloch or to take new information into account.

The historical study of Indo-Aryan languages may be said to have started on a firm footing with R.G. Bhandarkar's *Wilson Philological lectures* delivered before the University of Bombay in 1877 which gave a very clear expose of the development of the Aryan speech in India from the Old Indo-Aryan onwards. "The method I followed" as Bhandarkar has said in the preface to the lectures" is strictly historical, tracing the modern vernaculars from the original Sanskrit through all the different stages of development of which we have evidence and assigning the different transformations to their causes, natural or physical, racial and historical".

The next major study was S.K. Chatterji's *The Origin and Development of the Bengali Languages* (2 vols, 1926) and *Indo-Aryan and Hindi* (1942). In his foreword to ODB, George Grierson states: "Endowed with a thorough familiarity with Bengali - his native tongue - he has been able to bring together an amount of material which no European could never have hoped to collect; and he has had the further advantage of pursuing his theoretical studies under the guidance of the greatest European authorities on Indian Philology. This work is accordingly the result of a happy combination of proficiency in facts and a familiarity with theory and exhibits a mastery of details controlled and ordered by the sobriety of true scholarship".

For any Indian scholar desiring to make contribution to Indo-Aryan, Professor Chatterji had set the qualifications which he himself achieved working diligently and getting trained under the great masters in Linguistics of that time. Regarding this qualification, Chatterji states thus: "The linguistics of Vedic and Sanskrit has been the gift of European science, to the world in general and to India in particular, but Indian scholars are not yet properly equipped to make any real contribution to it. This equipment consists not only in a thorough knowledge of Vedic and Sanskrit, which is not wanting in India, but an equally thorough acquaintance with the ancient Indo-European languages and their history combined with a proper appreciation and assimilation of the present day comparative and historical method. In addition to this, a working knowledge of German and French in which most of the researches done in the field is enshrined, over and above that of English, is a necessity" (from "Linguistics in India" 1917-42). With deep knowledge of the English language (his M.A. was in Old and Middle English with Germanic and English linguistics as special subjects), and good knowledge

of Sanskrit, Chatterji had his training at London in Phonetics under Daniel Jones and had attended lectures in London (of Dr. F.W. Thomas -IE linguistics, Dr. L. D. Barnett - Prakrit and Indo-Aryan, Sir Denison Ross -Persian, Prof. Robin Flower - Öld Irish, Prof. Chambers - Old English and Gothic) and in Paris (of Prof. Jules Bloch - Indo-Aryan, Prof. A. Meillet -Indo-European, Prof. Jean Przyluski - Austro-Asiatic) under some of the top men in Philology and Linguistics. As regards the continental European languages he knew French very well and German tolerably well. He could speak Italian, Spanish and some other languages like a native of that language. In the opinion of M. Winternitz, Professor Chatterji was "thoroughly familiar with the western methods of philological-historical investigation" and at the same time had a knowledge of linguistic facts which "no European scholar could ever hope to acquire".

Prof. Chatterji has treated in his works the developments in Middle Indo-Aryan and also those from Middle Indo-Aryan to the modern languages. His treatment does not, however, present a clear picture of the relationships of the various Indo-Aryan languages to each other. Both of his works are more significant for the study of the individual languages, Hindi and Bengali, than for comparative Indo-Aryan. His contribution to Old Indo-Aryan is rather less since his interest was not confined to any one aspect of Indology, seeking to get at the underlying unity of the complex phenomenon that is Indian life and culture.

B. SPOKEN SANSKRIT

The term *saṃskṛta* refers to one of the two important varieties of Old Indo-Aryan, the other being 'Vedic'. If we understand the term to mean 'refined', 'polished', 'purified', spoken by the *śiṣṭas* 'elite' we need then to assume that there were other varieties too which were not so refined and therefore not employed for literary composition. They may have remained simply spoken forms. It is needless for me to say that a

speech is primarily spoken and only secondarily employed for writing. The variety adopted for literary composition becomes uniform while variation continues to be found only in the spoken varieties which alone may be called the living dialects of a language. Evidence for this is not lacking. In the *kauṣiitaki Braahmaṇa*, the dialects of the Northwest tract is mentioned as the standard form of speech (vii.6). The *Śatapatha Braahmaṇa* describes the *kuru-paṇcaalaas* as speakers of the best variety (111.2.3.15). This would then mean that the varieties spoken in other areas and by other speakers were not standard; they may have been substandard.

The term has an implicit allusion to *saṃskaara*, i.e., 'what results from grammatical achievement'. This sense of *saṃskaara* is found in Nirukta (1.12) - lit. 'correct grammatical formation'. The interpretation of the term *saṃskṛta* figures in the *ṣaḍbhaaṣa a candrikaa* where it says 'one calls Sanskrit that language which has been carried to formal perfection by the systems of *kumaara, Paaṇini* and others. A grammatical use of the term is available in the *Śatapatha Braahmaṇa* (x.5.1.3) -*vaacam hyevaitaaṃ saṃskurute*.

Who are the *Śiṣṭas*? *Pataṇjali* first suggests that the *Śiṣṭas* are grammarians who have received instruction that is preceded by a work that imparts such instruction. Since this explanation involves circularity, he goes to characterize the *Śiṣṭas* not by their instruction in grammar but by their dwelling place (*nivaasataḥ*) and their behaviour (*aacaarataḥ*). These model speakers are Brahmins who dwell in *Aaryaavartta*, the country of the Aryas in the north-centre of the subcontinent, where alone their exemplary behaviour is found. Brahmins who dwell in this abode of the Aryas and have only as much grain as they can carry in a small pot, are not greedy for honour, following established rules of correct behaviour... and who have attained total expertise in some traditional area of learning without explicit instruction, these honourable ones are the *Śiṣṭas*.

Was Sanskrit ever spoken? I don't think anyone will even ask such a question. It was certainly spoken. But was it a mother tongue or a second language? I would think it was the mother tongue of the Aryans and was learned as a second language by those who interacted with them, viz., the Dravidians. The Aryans too who spoke different varieties (e.g. *he'layah* for *he'rayah*) at home may have learned the 'refined form' at school. There is evidence to say that while they used the standard form on formal occasions (e.g. *yad vaa nah*) used however on other occasions substandard (e.g. *yar vaa ṇah*) form. Regarding Sanskrit spoken as second language by non-Aryans, we may mention only a few names such as the Great *Aacaaryas, Mallinaathasuuri* who commented on the works of *Kaalidaasa* and *Kumaarila* the great *miimaansaka*. Was Sanskrit spoken only by the Brahmins? Of course not; the word *dvija* refers equally to all the three *varṇas*, viz. *braamaṇa, kṣatriya,* and *vaiśya*. Who does not know the story of *Gaargya* and *Ajaataśatru*? In the *Bṛhadaraṇyaka, Ajataśatru*, the king of *kaaśi*, a *kṣatriya*, gives instruction on the self to *Gaargya*, a *Brahmin*. In the *Chaandogya*, there is a discussion on *Udgiitha* in which *Pravaahaṇa*, son of *jivala*, also took part. He was not a Brahmin. He says: 'I will listen to you Brahmins discussing, first'. The story of *Satyakaama*, son of *Jabalaa*, a maid-servant, is equally well-known. Was Sanskrit spoken only by men? There are plenty of instances to confirm that women too spoke the same tongue. The story of *Yaajṇavalkya* and *Maitreyi* where the former teaches maitreyi about the highest truth is given in the *Brhadaaṭaṇyaka. Gaargii* took part in debates with *Yaajṇavalkya*. In modern times, *Bilhaṇa* (11th century) mentions in his *Vikramaankadevacarita* that in Kashmir even women in every house spoke Sanskrit like their mother tongue. Finally, was Sanskrit spoken during *Paaṇini's* time? Was he writing a grammar for his native speech

or for the written form? He must have been writing *Aṣṭaadhyaayii* basing on the Northern variety of Sanskrit of which he was a native speaker. The differences in the Eastern variety are also carefully noted.

To end this, we may quote Cardona, a modern authority on *Paaṇini*. He says that in *Paaṇini's* time, the language he used and described in his grammar was the major vehicle of learned discourse and ritual in use among members of a community, wide spread through the north of the subcontinent, that constituted a linguistic and social elite, and that this language then coexisted -- as Sanskrit did in later times -- with vernaculars used in less formal circumstances and by other speakers.

A NOTE ON PAMPA'S CONNECTIVE MARKER -*am*

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Coordinate constructions in Kannada as attested in Pampa Bharata of 10th century A.D. involve two types of connective markers namely -*um* and -*am*. (Ramachandra Rao, 1972:182-184). Consider the following examples.

A. Connective Marker -*um*

1. *taay-um tandey -um* (p.183)

   'mother and father'

2. *bill-um amb-um* (p. 183)

   'bow and arrow'

3. *uṇṇadey-um....nilladey-um*(p.182)

   'without eating and staying'

4. *iḍut-um---aarut-um....numgutt-um*(p.182)

   'hittnig hard, crying aloud and swallowing'

5. *kuḍal-um... pasarisal-um*(p.183)

   'to give and spread out'

B. Connective Marker -*am*

6. *arasaŋ-g-am arasi-g-am*(p.183)

   'to the king and the queen'

7. *niir-o[-am kicc-in-o[-am*(p.183)

   'in water and fire

8. *kall-o[-am mara-d-o[-am*(p.183)

   'with stone and tree'

9.   *soomkid-oḍ-am..vokk-oḍ.am....gaṇḍ-oḍ-am*(p.183)

'even if touched or entered or seen

Not always *-am* performs connective function. Notice *-am* in the following constructions is non-connective in character.

10.   *nooḍuv-oḍ-am*(p.184)

'even if seen'

11.   *kula-kk-am*(p.184)

'even to the lineage'

12.   *idark-am*(p.184)

'to this too'

13.   *matta-am* (p.184)

'even after'

The function of *-am* attested in (10) -(13) is performed by *-um* in Tamil and Malayalam. It is to be noted that *-um* and its reflexes in Dravidian are associated with more than one grammatical function.

Of the two connective markers *-um* and *-am* figuring in Pampa's Kannada, the latter is not attested in Tamil and Malayalam, and even in Kannada its occurrence is subject to reconsideration. Since the function performed by *-um* in Tamil and Malayalam are performed by *-am* in restricted construction types in Kannada, we suspect that the latter is a consequence of reanalysis. Our concern in the present note is to consider the emergence of *-am* as a connective marker in the linguistic system obtained in Kannada.

In Kannada, the connective marker *-am* is noticed to occur after the conditional, dative and locative-instrumental conjuncts besides non-coordinate construction illustated in (10)-(13). The fact that nowhere else in Tamil and Malayalam *-am* is attested as connective marker suggests that the nasal of *-am* has the possibility

of being treated as an alternant of *-um*. This is confirmed by the fact that *-um* has a nasal alternant as evidenced in the constructions *pac-um+pon/pay-m+pon* 'gold'(lit. yellow metal'). There are alternants in Tamil ending in *-y* and labial nasal. Consider the examples *paṇay/paṇam* of *palmyrah teṇṇay/teṇṇam* 'of coconutt' and *taalay/taalam* 'of screwpine' *puṭalay/puṭalam* 'of snake-gourd', *tuvaray/tuvaram* 'of red-gram' etc. In all these cases, the second is a consequence of loss of word-final *-y* before the nasal increment *-m* e.g. *paṇay-m>paṇa-m*. The Tamil situation provides thus a basis to maintain that the connective marker *-am* obtained in Pampa's Kannada has the scope of being derived from the underlying system *ay-m* where the nasal marker is identifiable as an alternant of *-um* which performs the connective function not only in Tamil and Malayalam as already mentioned but also in Pampa's Kannada as evidenced in (1)-(5).

The possible source suggested to the connective marker *-am* of Kannada reveals that the vowel segment of *-am* is traceable to *-ay*. The loss of *-y* before the nasal alternant of *-um* has resulted in the reanalysis of the vowel segment of *-ay* leading to the emergence of *-am*. A question arises at this point as to the grammatical significance of *-ay*. We will come to this issue shortly.

In early Tamil, the dative suffix is occassionally *-kka*. e.g. *aaciriyar -kka* (Tol. Eḻuttu. Iḷam 390) 'to the teacher/ master'. This makes it obligatory to treat the Kannada dative *-kke/-ge* and its Tamil counterpart *-kka* as reflexes of **-kay*. The reconstruction implies that the coordinative dative construction *arasaN-g-am arasi-g-am* 'to the king and the queen' illustrated in (6) derives from an early system of the following type.

14. **aracan-kay-m araci-kay-m*
     king-dat-conj queen-dat-conj
     'to the king and the queen'

The type of analysis leading to the identification of a coordinate dative construction of the type available in (14) reveals

that *arasan-g-am arasi-g-am* is a consequence of an analysis which is confined to the level of observational adequacy. In a descriptively adequate analysis, the vowel segment of *-am* will be part of the dative suffix i.e. *arasaN-ga-m arasi-ga-m* which is nearer to (14) in terms of formal representation of the dative suffix *-kay*.

In Pampa's Kannada, *oḍe* is conditional suffix (Ramachandra Rao, 1972:142) e.g. *ban-d-oḍe* 'if came', *peel-d-oḍe* 'if told' *peel-v-oḍe* 'if tells' *uḷḷ-oḍe* 'if exists. The coordinate conditional constructions with the connective marker *-am* illustrated in (9) provides internal evidence to reconstruct the conditional suffix *oḍe* into **oḍay*. We have now reason to maintain that the coordinate conditional constructions attested in Pampa's Kannada derive from a system of *A-*oḍay-m* + B-*oḍay-m* which following the loss of *-y* before *-m* is reanalysed as A -*oḍam* + B-*oḍ-am* in an observationally adequate description, and properly analysed as *A-*oḍa-m* B-*oḍa-m* in a descriptively adequate treatment.

The instrumental-locative coordinate construction illustrated in (7) and (8) are however problematic since we are lacking internal evidence to reconstruct the instrumental-locative suffix *oḷ* into **-oḷay*. In a descriptively adequate analysis, the constructions in (7) and (8) can be analysed as in (15) and (16) in order to maintain consistency.

15.   *niir-oḷa-m   kicc-in-oḷa-m*
       water-loc-conj fire-emp-loc-conj
       'in water and fire'

16.   *kall-oḷa-m mara-d-oḷa-m*
       stone-inst-conj tree-emp-inst-conj
       'with stone and tree'

The occurrence of locative post-position *uḷḷe* in Tamil confirms that the analysis presented in (15) and (16) is on the right track. However the descriptivist is not obliged to take such out-of-boundary evidence in to consideration. This does not imply

that the synchronic description has no historical relevance. We consider that a descriptively adequate analysis is very much concerned with deep-seated regularity and internal consistency of the linguistic system. Internally consistent analysis is not only descriptively adequate but also seeks to reflect the directions of linguistic change. The only area where this analysis fails flat is the construction types which are a consequence of analogical creation. If, for instance, the descriptivist has reason to believe that the connective marker *-am* in (7) and (8) is due to analogical extension, then there is no scope for such analysis presented in (15) and (16). Otherwise, the dative and conditional coordinative constructions provide a reasonable basis to justify the analysis proposed in (15) and (16) despite lack of internal evidence.

Notice, *-am* figuring in the construction illustrated in (10)-(13) is non-connective in character. Since the constructions *noo ḍuv-o ḍ-am* 'even if seen' *kula-kk-am* 'even to the lineage', and *id-ar-k-am* 'to this too' involve conditional and dative markers, the analysis we proposed earlier holds good in these cases also. The construction *matt-am* 'even after' in (13) deserves explanation. The construction *mattey-um* 'again and again, continuously' (Ramachandra Rao, 1972:184) provides evidence to reconstruct *matt-am* into **mattay-m* (<**mattay-um*) the rule that *-y* is lost before *-m* derives *mattam* from *mattay-m* where the construction - final labial nasal is an alternant of *-um*.

Although we are fairly certain that the connective marker - *am* attested in Pampa's Kannada as a variant of *-um* drives from **ay-m*, our conclusion in this respect is based on comparative evidence. The issue with respect to the source of am has to be resolved within the synchronic material. Notice the non-occurrence of am after nouns as a connective marker. The only suffix that occurs in this context performing connective function is *-um*. The very fact that *-am* occurs as connective marker only in restricted construction reveals that it has no scope of being treated as a normal suffix. This implies that *-am* is a consequence of reanalysis.

Once this conclusion is arrived at, we are obliged to treat the nasal segment in *-am* as an alternant of *-um*, and the vowel segment of which belongs to the proceeding morpheme. The preceding morphemes are dative and conditional ending in *-e* i.e., *kke/ge* and *o ḍe*. The fact that the vowel segment of *-am* is part of the preceding morpheme reveals that the dative conditional markers ending in *-e* are associated with alternants ending in *-a* i.e., *kka/ ga* and *o ḍa*. The dative and conditional alternants ending in *-a* are distributionally restricted by virtue of their occurrence before the connective marker *-m* which is an alternant of *-um*. We have now reason to analyse the coordinate construction *arasaNgam* +*arasigam* 'to the king and the queen' illustrated in (6) as *arasanga-m -arasi-ga-m* instead of *arsan-ga-am* + *arasi-g-am*. The alternants *kke/ge and kka/ga* and *o ḍe and o ḍa* ending in *e* and *a* suggest that the vowel reflexes derive from a common source. If synchronic evidence is not available to determine the common source of vowel reflexes *e* and *a*, the issue may be resolved by treating *kka/ga* and *o ḍa* as alternants of *kke/ge* and *o ḍe* respectively.

REFERENCE

Ramachandra Rao, B. 1972. *A Descriptive Grammar of Pampa Bhaarata. Prasaaraanga*. Mysore: University of Mysore.

OBITUARY

DR. ARUNKUMAR SHARMA

BORN: 09-08-1944   **DIED ON:02/03-09-1999**

The Department with profound regrets inform about the sad demise of Dr. Arunkumar Sharma, a member of the faculty.

Dr. Arunkumar Sharma joined this department as a student in the year 1965 and obtained his M.A. degree in Linguistics in the year 1967. In 1968 he travelled to Texas University, U.S.A. and continued his research in linguistics. In 1975 he got his Ph.D. degree in Sociolinguistics from Texas University. He joined the faculty of Osmania University, Department of Linguistics in October, 1977 as a Lecturer and rose to the positions of Reader in 1982, and finally as a Professor in 1994. During his service time Dr. Arunkumar Sharma served the department in various capacities viz., as Head of the Department, as Chairman Board of Studies, as Coordinator of the Centre of Advanced Study in Linguistics programme.

NEWS OF THE DEPARTMENT
1999

In the Advisory Committee meeting held on 17-7-1999, a decision was taken to merge the positions of Head of the Department and Coordinator of CAS programme. Subsequently, Prof. V. Swarajya Lakshmi, Head of the Department has assumed charge of the Coordinator of the Centre too.

During the academic year 1999-2000, the Department initiated two collaborative research projects, which are being processed by the Department of Science and Technology, Government of India.

1.   Development and validation of a computer assisted instructional package for teaching beginning reading skills in Indian Languages collaborating the Department: Department of Biomedical Engineering and Department of Computer Sciences and Engineering, O.U.

2.   Setting up a Rehabilitation Engineering Centre to develop Assistive listening technologies. Collaborating Department: Department of Biomedical Engineering O.U.

Dr. D. Vasanta, a faculty member of our Department is the Principal Investigator on both these projects.

The Department has procured two computers and software in the fields of phonetics and speech pathology, utilising the funds sanctioned under CAS Phase - II non-recurring grant.

FACULTY PUBLICATIONS

Aditi Mukherjee. Reviewed Paulo Freire's *Pedagogy of Freedom* (1998) in *Summerhill* the review Journal of the Indian Institute of Advanced Study at Shimla.

Nagamma Reddy, K. 1999.'Vowel and consonant length contrast in Telugu'. *Proceedings of the XVI International Congress of Phonetic Sciences,* San Francisco, UCLA, USA. (Available on CD ROM).

.... 1998, 'Distinctive vowel quality, quantity, and nasalization in Telugu and Hindi'. *Osmania Papers in Linguistics.* Vol. 24. 49-59.

........(Co-edited with Rajeev Sangal and G. Umamaheswar Rao), Proceedings of the *Information Revolution and Indian Languages,* Language Technology Research Centre. Indian Institute of Information Technology, Gachibowli, Hyderabad. 1999.

Ramesh Kumar, K. Edited, *Osmania Papers in Linguistics, Volume* 24, 1998.

Vasanta, D. (Coauthored with P. Sailaja). 1999. Making sense of compound nouns: a study of word relatedness in Telugu. *Journal of Psycholinguistic Research* Vol. 28 No. 4, 331-346.

FACULTY ACTIVITIES

B. Lakshmi Bai

◆ Director, National Seminar on Dravidian Linguistics: Diachronic, Synchronic and Applied Perspectives, organized by the Centre of Advanced Study in Linguistics, Osmania University, Hyderabad. February 19-20, 1999.

◆ Presented a paper - 'Development of Tamil Z in child language' in the National Seminar on Dravidian Linguistics: Diachronic, Synchronic and Applied Perspectives, organized by the Centre of Advanced Study in Linguistics, Osmania University, Hyderabad. February 19-20, 1999.

Aditi Mukherjee

- Fellow at Indian Institute of Advanced Study, Shimla from Sept. 1997 to Dec. 1999 and worked on a project on 'Literacy: the Indian context' and submitted a monograph when the project was completed in Dec. 99.

- Participated as resource person to train school teachers from the districts of West Bengal, as part of a team appointed by the West Bengal, DPEP, Ministry of Human Resource Development, Government of India. July, Dec., 1998 and Jan., April 1999.

- Presented a seminar on 'Face and Literacy' at the Indian Institute of Advanced Study, Shimla in October, 1999.

K. Nagamma Reddy

- Delivered Keynote Address - 'Dravidian Phonology' to the UGC National Seminar on Dravidian Phonology, Centre of Advanced Study in Linguistics, Annamalai University, Annamalainagar. January 21, 1999.

- Presented a paper - 'Duration as an independent variable in Telugu' at the National Seminar on Dravidian Linguistics: Diachronic, Synchronic and Applied Perspectives, CAS in Linguistics, Osmania University. February 1999.

- Presented a paper - 'Linguistic Functions of Length beyond Word Level in Telugu' at the 27th All India Conference of Dravidian Linguists. Thiruvananthapuram. June 1999.

- Assessment and Review of the Book '*Surabhi' Pedda Bala Siksha* by Sri Buddiga Subbarayan, Submitted to the CIIL, Mysore, 1999.

Conducted Seminars/Public lectures

- Convenor and Chaired a session on Speech Processing, 'Information Revolution and Indian Languages' organised

jointly by the Department of Computer Science, Osmania University and Society for Computer Applications in Indian Languages (SCIL), Hyderabad. November, 1999.

♦ Convenor (Andhra Pradesh Chapter), Silver Jubilee, Indian Academy of Social Sciences, Allahabad from 15.8.99 to 15.8.2000. Arranged public lectures at ICSSR Conference Hall, Osmania University Library by eminent personalities in collaboration with ICSSR - SRC, Hyderabad.

Guest Lectures/Resource Person

♦ Delivered Lectures - 'Advanced Phonetics' at the UGC Refresher Course, Annamalai University, Annamalainagar. 30th March to 1st April'99.

♦ Resource Person, Workshop on Instrumental Study of Various Phonetic Features of Indian Languages at Central Institute of Indian Languages, Mysore. October 26th to November 2nd '99.

♦ Participated as a Resource Person in the Seminar on 'Communal and Social Harmony', organised by ICSSR-SRC held at ICSSR Conference Hall, Osmania University, on 7th December '99.

♦ Chaired a session of the UGC National Seminar on 'Dravidian Phonology'. CAS in Linguistics, Annamalai University, Annamalainagar. January 21-23, 1999.

Research Project

♦ UGC Major Research Project continued during the year 1999 on 'Suprasegmentals in Telugu: Acoustic Phonetic Structure and Linguistic Function'.

Extra-curricular and other Activities

♦ Attended Research Committee Meetings as external expert at Central Institute of English and Foreign Languages, Hyderabad. 1999.

Membership of Learned Societies

◆ Elected Executive Council Member of International Phonetic Association from 1999 to 2003.

◆ Nominated Executive Council Member of Society for Computer Applications in Indian Languages (SCIL) from 1999-2000.

◆ Elected Executive Council Member of Indian Academy of Social Sciences, Allahabad for 1999.

◆ Secretary, Dravidian Linguistics Association, Thiruvananthapuram, 1999 - 2000.

V. Swarajya Lakshmi

◆ Presented a paper - 'Linguistic difference between the text book dialect and home dialect of Telugu- A case study in Andhra Pradesh' at a National Seminar on Research and Innovations on Home and School Language Issues' organised by DPEP and CIIL at Mysore. January 18-20,1999.

◆ Presented a paper (in absentia) - 'Language issues in Telugu in the context of multi dialectal situation' at the International Conference on South Asian languages and Linguistics, organised by SALA at Illinois, USA. July 9-11, 1999.

D. Vasanta

◆ External Expert on the Research Committee, Central Institute of English and Foreign Languages (CIEFL), Hyderabad for a period of two years from Sept. 1998 to Sept. 2000.

◆ Presented a paper - 'Word reading processes in Telugu deaf children' at the National Seminar on Reading Processes and Acquisition: Advances in Indian Research' organized by the Centre of Advanced Study in Psychology, Utkal University, Bhubaneswar, Orissa. March 19-20, 1999.

- ◆ Delivered a lecture - ' Hearing aid ear-canal coupling systems: the role of earmould acoustics' at the UGC sponsored Refresher Course in Physics for College Teachers organized by the Academic Staff College, O.U. 15-5-99.

- ◆ Delivered a lecture - 'Disorders of Communication' to the participants of the UGC sponsored orientation course organized by the Academic Staff College, O.U. 28-6-99.

- ◆ Delivered a lecture - 'Impact of hearing loss in communication and education' to the training officers of various Industrial establishments in A.P. As part of the orientation course organized by the Training Centre for the Adult Deaf and supported by the Ministry of social justice and empowerment, Govt. of India. 3-8-99.

- ◆ Delivered an extension lecture - 'Human communication and its disorders' to the college and University teachers participating in the UGC sponsored refresher course organized by the Academic Staff College, O.U. 7-10-99.

- ◆ Presented a paper (Coauthored with Madhav S. Kavuru and Sameen Fatima) - 'Computer -aided lexical resource for teaching beginning reading skills to Telugu children' at the National Seminar on Information Revolution and Indian Languages, organized by the society for Computer Applications in Indian Languages and the Dept. of Computer Sciences and Engineering, O.U. November 14-16, 1999.

- ◆ Participated in the South Asian Conference on Education held at the Central Institute of Education, University of Delhi. November, 16-18. 1999.

A. Usha Rani

- ◆ Presented a paper - (Coauthored with V.Sailaja) 'Dative constructions in Telugu children's speech' at the 2nd International Conference on South Asian Languages (ICOSAL-II) and Chaired a parallelsession on

Psycholinguistics, Department of Anthropological Linguistics & Punjabi Language. Punjabi University, Patiala. January 9-11, 1999.

◆ Presented a paper - (Coauthored with V.Sailaja) 'Dative subject in Telugu children's speech' at the National Seminar on Dravidian Linguistics, Diachronic, Synchronic and Applied Perspectives. Dept of Linguistics, Osmania University. February 19-20, 1999.

◆ Presented a paper - 'Productivity of dative in Telugu children's speech' at SALA, University of Illinois at Urbana Champaign, USA. July 9-11, 1999.

◆ Presented a paper - 'Agreement in Telugu Broca's aphasics' at SALA, University of Illinois at Urbana Champaign, USA. July 9-11, 1999.

'COMPUTERS IN HUMANITIES & SOCIAL SCIENCES': A LECTURE SERIES PROGRAMME HELD ON 17-9-99 AND 18-9-1999

This programme was initiated by the Centre of Advanced Study in Linguistics(CASL), Osmania University during the month of September 1999. The speakers, consisted of Prof. D.V.R. Vithal (Retired Professor, Department of Electronics and Communication Engineering, O.U.), Dr. R. Narasimhan (C.M.C. National Fellow in Information Technology, Bangalore), Ms. Sameen Fatima (Associate Professor, Department of Computer Science and Engineering, O.U.) and Prof. Rajeev Sanghal, Prof. Vineet Chaitanya and Dr. Uma Maheshwara Rao, members of the Anusaaraka (Machine translation) group from the University of Hyderabad. Prof. V. Swarajaya Lakshmi, Head and Coordinator, CASL welcomed the gathering and introduced the speakers.

In his talk (on 17-9-99) on the capabilities of computers, Prof. Vithal spoke about the developments in the field of information technology during the past five decades, discussed some of the

terminology and outlined the scope of the field. The two hour discussion was attended by research students and teachers from different language related disciplines.

On the forenoon of 18-9-99, Prof. Narasimhan introduced the audience (from Osmania University, Central Institute of Hindi, Central Institute of English & Foreign Languages, Central University) to the varied issues involved in processing natural languages on a computer. He commented that while the Anusaaraka group has made a great deal of progress in the field of machine translation involving Indina languages, many more areas are awaiting the attention of language scholars. He requested Prof. Rajeev Sangal to talk about their progress to set up a 'Language' Technologies Research Institute (LTRI) in Hyderabad. Prof. Sangal spoke for over an hour about the LTRI and new areas of research in information technology involving Indian languages.

In the afternoon session on 18-9-1999, Ms. Sameen Fatima presented a paper on 'Computer Aided Stylistics'- a topic on which she is currently pursuing doctoral studies. She also talked about the importance of familiarising students with the use of facilities like internet worldwide web, digital libraries etc. and discussed the implications of her research on analysing newspaper language using computers. Her Ph.D. guide Prof. R. Krishnan (Associate Director, Advanced Data-processing Research Institute, Hyderabad) also participated in the discussion following this paper.

In the final session, a panel discussion involving all the invited speakers was held primarily to discuss the tentative syllabus drawn for the proposed M.A. Level course on 'Computers in Linguistics' (CiL) to be offered by the CASL during the next academic year. The panel discussion was chaired by Prof. Jacob Tharu (Dept. of Testing and evaluation, CIEFL). Besides making many suggestions regarding the syllabus, the members of the panel identified certain research priorities in the field keeping in mind the needs of students as well as the background of the staff members.

Prof. Rajeev Sangal felt that the syllabus must include information on Mark-up languages like HTML and that topic 4 can be dropped. Instead, topics pertaining to Morphological and grammars, computational lexicography and corpus based studies should be included.

Prof. Narasimhan felt that rudimentary aspects of programming should be taught to the students of this course. Alternatively one should make attendance in an entry level course offered by the Computer Science Department, O.U., as a prerequisite for taking this course (CiL). Prof. Vithal commented that since it is a course planned for a whole year, it can be structured into two components; part A - Introductory concepts and Part B- Theory + Lab work. To facilitate fair valuation, it is advisable to stick to one text book from which at least 80% of the course material is taken. Prof. Rajeev Sangal felt that students of Linguistics should not be made to go to Computer Science Department for learning the basics. Instead, if a faculty member of the Linguistics Department teaches, he/ she would give examples from the field which will help students immensely. Professors Narasimhan and Jacob Tharu endorsed this suggestion. Ms. Sameen Fatima opined that students should be taught to use internet and world wide web/ and that the course should be designed from user's point of view.

Dr. D. Vasanta proposed a vote of thanks on behalf of the CASL.

Guest Lectures

Sri R.V.S.S. Avadhanulu Deputy Director (Computer Facility), Nizam's Institute of Medical Sciences has delivered two lectures on 15th and 16th October, 1999 on the following topics:

1) Design of Vedic Database with Indian Scripts.

2) Modern Sciences in Vedas and Sastras.

National Seminar on Dravidian Linguistics: Diachronic, Synchronic and Applied Perspectives was held during February 19-20, 1999. The theme of the seminar was selected in order to felicitate Dr.Bh.Krishnamurti, the founder member of the Department, and a well known Dravidologist. The Seminar had the following broad themes pertaining to Dravidian languages and linguistics.

Diachronic

i)   Issues relating to comparative and internal reconstructions;

ii)   Historical development of linguistic features in particular Dravidian languages or groups;

iii) Problems of sub-grouping;

iv)   Diffusion of linguistic change-process and mechanism;

v)   Contract and convergence-Dravidian languages in interaction with members of other language families of India.

Synchronic

Descriptive account of linguistic elements pertaining to phonetic, phonological, morphological, semantic and pragmatic aspects of Dravidian languages both literary and non-literary; Contrastive studies involving Dravidian languages with non-Dravidian languages.

Applied

i)   Language Variation: Regional, Educational and others;

i)   Education: Language teaching, Language learning, Planning, Language material for literacy, Language disorder and Linguistic interventions;

ii)   Lexicography: Issues relating to preparation of glossaries, dictionaries etc. for monolingual, bilingual and multilingual purposes;

iii) Translation: Translation of texts-technical and literary, problems in natural language processing and machine translation;

iv) Stylistics: Aesthetic use of language in different genres including folk literature;

v) Language and Media: Specialised features of language in media use such as Newspapers, Press, Advertising etc.

Prof. Pramod Talgeri Vice Chancellor, Central Institute of English and Foreign Languages inaugurated the seminar. Prof. H.S.Ananthanarayana, Prof. of Linguistics (Retd.) presided over the function. Prof. E.Annamalai Director(Retd.), Central Institute of Indian Languages presented the key note address.

The response was overwhelming and in all about 32 papers were presented by scholars in the field . Prof. M.B.Emeneau, the leading personality in Dravidian linguistics and the teacher who paved the way to many Dravidian scholars including Dr.Bh.Krishanmurti also sent a paper entitled "Notes on Dravidian initial nasals and palatals". Prof. R.E.Asher (Edinburgh University, United Kingdom) was expected to participate in the seminar but owing to some difficulties could not do so. His paper entitled "Literature as a source of data on spoken dialects of Dravidian languages" was presented at the seminar. Dr.Annie Montaut (Inalco/CNRS, Paris) presented a paper entitled "On the borrowing of the Dravidian specific quotative system into a language with Indo-Aryan specific correlative system". Dr.E.Annamalai, Ex-Director, Central Institute of Indian Languages, Mysore, presented the keynote address. He gave a future direction for the budding linguists. Dr.Krishnamurti in his address discussed "Landmarks in Dravidian studies in the 20th century".

In the four academic sessions that followed scholars presented their papers which were widely discussed and appreciated.

At the valedictory session of the seminar, the photographs of the retired teachers were unveiled and they are placed in the Department.

Prof. B. Lakshmi Bai and Prof. J.Venkateswara Sastry, the Director and Secretary of the seminar, plan to bring out a Special Volume of the proceedings.

RESEARCH PROJECTS

I. A Report of the Research Project on **"Phonetics and Phonology of Semivowels and Diphthongs in Telugu"** based on the fieldwork carried out during the year 1996 by **Dr. K.Nagamma Reddy.**

1. Considering the problem of phonological analysis and the articulatory nature of Semivowels and diphthongs, a list of Telugu words was prepared (which were collected from the field, Telugu dictionaries and computer Telugu lexicon) containing semivowels and diphthongs. The list was also used for the purpose of distributional studies. It is a known fact that in colloquial Telugu we can distinguish at least four regional varieties: Northern, Southern, Eastern and Central. Each variety in turn has social dialects reflecting levels of education, class, occupation, age, sex and so forth. Educated variety may be further distinguished from formal and informal; and uneducated from rural and urban, and within the rural variety there may be a distinction between class and occupation. Variation in pronunciation of diphthongs also seems to be governed by the system of native or borrowed vocabulary. The aim of this project, therefore, was to show various factors that contribute towards the analysis and description of the diphthongs and semivowels in Telugu, which are controversial in literature on Telugu in particular and languages. The main purpose was to undertake a phonetic and phonological investigation of the semivowels (/y/ and /w/ or /j/ and /v/) and the two diphthongs /ai/ and /au/ in Telugu and to describe their structural patterning, phonological status, realizational or distributional differences, by gathering a variety of data in different contexts, and to make instrumental verification.

Telugu alphabet contains the diphthongs /ai/ and /au/ each of which is represented by a single character. However, there is a considerable variation in the pronunciation of these diphthongs in such examples as /aite/ ~ /ayite/ 'if so' or /aunu/ ~ /awunu/ 'yes' depending on the style and speed of speaking. Such

alternation raises problems in examples such as /kaulu/ 'lease' and /kawulu/ 'poets'. Interpretation of diphthong either as unit phoneme or as vowel cluster or vowel plus semivowel sequence, depends upon several factors such as phonological system of the specific language and its phonotactic patterns. The phonologists are often faced with the question whether a given diphthong should be recognised as a manifestation of one phoneme or of two phonemes. Different criteria may lead to different directions, and alternative solutions with equally valid reasons for arguing diphthong as a sequence of vowel + glide (i.e. semivowel) or a single diphthong as vowel. If the segments are to be interpreted as one unit, they must fall within the same syllable. Diphthong by definition belongs to the same syllable. By treating it as consisting of a vowel + (semivowel) consonant sequence, the semivowel belongs to the following syllable if it is followed by a vowel. The sequence is, then, divided across the syllables.

For the past five decades, there have been several studies on diphthongs pointing towards contradictory issues regarding their nature and status. The definition of diphthong also has been put forward in various ways. That is, the definitions and interpretations of diphthongs given by different researchers do not always agree with each other. This is due to the multiplicity of criteria and approaches followed in the description and analysis of diphthongs - articulatory, acoustic, perceptual or some combination of these. We must ask whether the symbols used in the impressionistic transcriptions of the diphthongs have the same acoustic and articulatory values as do their simple vowel or semivowel segments that they represent.

No one has discussed so far what kind of diphthongs or semivowels are there in Telugu. Are there diphthongs in Telugu which could be divided into or distinguished as 1) tense and lax, 2) segmental diphthongs and sequential, 3) diagonal diphthongs and vertical diphthongs, 4) genuine ones and pseudo ones, 5) paradigmatic and syntagmatic diphthongs 6) raising and falling

diphthongs, 7) closing and centring diphthongs 8) sequential and gliding diphthongs and many others? (Due to space, all these are not defined or discussed in detail at present).

When we look into the literature on typology of sound systems, diphthongs are often omitted, neither being treated as part of vowel systems nor as part of consonant systems. The problem with diphthongs ofcourse is that there is no obvious 'place' for them in the typological height vs backness system display as for the isolated monophthongal vowels. Should /ei/ be treated as a member of a front vowel system and /oi/ as back? Then this raises a problem of what should be done with the backness values like /ou/.

Phonological analysis of diphthongs also raises certain interpretation problems. A phonetic diphthong may have one of three phonological interpretations: 1) as s single phonemic unit, 2) as a sequence of two vowel phonemes and 3) as a sequence of vowel plus consonant (i.e. semivowel) phoneme. There are conflicting views about the existence or non-existence of diphthongs in some languages. Keeping all these various issues at the background, the present study is undertaken to discuss the diphthongs and their relationship with semivowels through instrumental acoustic analysis and findings. By this we can obtain more reliable phonetic specification of diphthongs especially of Telugu to answer the questions raised above.

There is a considerable discrepancy in the phonetic and phonological analysis and interpretation of semivowels and diphthongs not only in Telugu but also in other languages of the world. This research was mainly conducted to study and to measure the acoustic features (i.e frequency, intensity and duration) of semivowels (short as well as long) and diphthongs (/ai/ and /au/) represented by some scholars as vowel plus consonant (/ay/ and /aw/). Socio-phonetic and allophonic variants of these phonemes are not well attested so far in the literature. It is also well known that the word - initial vowels in Telugu are characterised

by an onglide. The articulatory description and phonological interpretation of the diphthongs and especially long semivowels is somewhat controversial. The alternative pronunciation and its representation in the lexicon (for instance, /ayidu/ for /aidu/ 'five' and /awunu/ for /aunu/ 'yes'), is governed by the rules of certain styles of speech, leading, however, to the changes in the syllable structure and creating new combinations with other segments which otherwise do not occur in the language. The present project, by collecting the speech database, from various sources with all possible occurrences of semivowels and diphthongs in different contexts and styles of Telugu, explores the distributional (i.e. phonotactic) possibilities and constraints and specifies their acoustic structure. The acoustic pattern of each of the different articulatory features is described and the semivowels are compared with the vowel onglides and the diphthongal offglides.

2. COMBINATORY POSSIBILITIES OR PHONOTACTIC PATTERNING OF DIPHTHONGS

Occurrence of Telugu diphthongs /ai/ and /au/ in words is somewhat limited, resulting in less number of words containing diphthongs when compared to that of words with short and long vowels. Both the diphthongs occur at word initial and word medial positions, but /ai/ can occur in word -final position as well. The following may be observed about the word-final diphthongs.

(a) the word final diphthong occurs only in multimorphemic words, such as /irawai/ 'twenty', /mupphai/ 'thirty', /arawai/ 'sixty' /nalabhai/ 'forty' etc. This is due to the deletion of certain consonants such as -d- in *padi, badi* or *vadi* which gives surface representation as *-pai/-phai, -bhai,* -wai respectively.

(b) Secondly in words like /paina/~/mi:da/ 'on', where 'na' is deleted and /-pai/ is added to the preceding noun as in /tala/ 'head,+ /pai/ 'above or on' changes to /talapai/ 'on the head' /aaroopa ṇalu/ + /pai/ > /aaroopa ṇalapai/ 'on the complaints'. Similar change occurs in the case of /kani/ 'for' > /kai/ as in /vee ṭakani/ > /vee ṭakai/ 'for hunting'.

(c)   When the contraction of certain words occurs, for example /
      tiyyi/ > /*tii/* or /*tiy/* 'remove (it)' or /*towwu/* > /*tow/*
      'dig (it)'

      The allophonic variations occur due to speech variations (e.g.
      colloquial vs formal).

(d)   When foreign words are borrowed from other languages, for
      example, English words pronounced as /*djuulai/* 'july' in
      Telugu.

      The following Table shows the distribution of diphthongs
in Telugu words

Table I

Diphthong type	Word Initially	Word Medially	Word Finally
ai	*aidu* 'five'	*tailamu* 'oil'	*irawai* 'twenty'
au	*aunu* 'yes'	*maunamu* 'silence'	*(au* ' yes')

Diphthongs and long vowels have almost same distributional
patterns. At syllable level when diphthongs are treated as true
vocalic segments (i.e. VV), the syllable structure is of open syllable
type, if not, then they function as vowel +glide (i.e. vowel +
approximant) leading to a closed syllable.

For example, /*ai/* occurs in open syllable in forms such as

/*aidu/* (VV-), but in /*aydu/*, it represents

/*aydu/* closed syllable (VC-) The latter is considered as occurring
in a heavy syllable. Thus, the phonological representation of
diphthongs in Telugu in different ways causes different kinds of
analysis and syllable patterns.

3. COMBINATORY POSSIBILITIES OF SEMIVOWELS

      The semivowels /*y/* and /*w/* can occur in all three positions
of a word. Occurrence or distribution of semivowels in initial

position before a vowel or a consonant shows the following constraints. Only /w/ occurs before an /r/ as in /wratam/ 'a religious vow'. /y/ occurs only with back vowels, not before a front vowel or a diphthong ending in a front vowel where it is treated as only as an onglide [y]. /w/ occurs only before front and back open vowels, not before rounded vowels or before a diphthong ending with a back rounded vowel because it is pronounced only as an onglide [w] not treated as a full segment. Even word medially, /y/ occurs before all vowels except /o/, /uu/ and /au/.

The following initial and medial cluster or sequence patterning with semivowels is found in Telugu:

a) Initial clusters with semivowels

   i)   as first element, only /w/ in /wr/ as in /wratam/ 'religious vow' occurs.

   ii) As second element, the following patterns are possible: /ty-, tw-, dy-, dw- jy-, jw-, ny-, nw-, dhy-, dhw-/.

b) Word medial sequences with semivowels

   If diphthongal offglide (i) and (u) are treated as /y/ and /w/ respectively, then these can combine as first element with almost all consonants occurring in Telugu. Otherwise, we could find only the following word medial sequences: -ty-, tw-, -ty-, -cy-, -ky-, -kw-, -dy-, -dy-, -dw -jy-, jw-, gy-, -my-, -ny-, ny-, -ly-,-ry-, -rw-, -wr-, -wy-, -hw-, sy-, -sw-, y-, w-, -khy-, -dhy-, -dhw -, -hy-, /; /-tsy-, -ndy-, -rjy-, -rś w-/.

(Details of distributional patterns of semi vowels with examples can be found in forthcoming publication).

4. SPECTROGRAPHIC ANALYSIS

Utterance initial vowels and their onset frequencies and duration are discussed elsewhere. The measurement of formant frequencies of F1, F2 and F3 for each simple vowel onset and

the steady state centre frequencies can be seen on Table 2. Onset refers to a relatively brief period leading into a dominant vowel quality.

Semivowel or onglide used before a simple (i.e. pure mono or diphthongal vowel) is an alternative transcription of simple vowels. Vowel plus semivowel is also an alternative way of transcribing diphthongs in Telugu.

Vowel plus semivowel plus vowel also occur in Telugu in examples such as /aawu/ 'cow' and /aayaa/ 'woman who takes care of a child'. Whether such segments should be regarded as an intrusive transition need to be observed on spectrograms further. The following spectrograms show the acoustic structure (i.e. formant positions and transition) of genuinely semivowels in contrast; and dipthongal offglides and their relationship with vowels, for instance, the relationship between /w/ and /u/ and /y/ and /i/, which are said to be articulatorily similar.

Spectrograms 1 to 6 show considerable difference between the segments under investigation. Non-syllabic vocoids show weaker energy (i.e. intensity) than the corresponding simple vowels. A detailed acoustic analysis of the utterances containing different segments under investigation in different structural combinations will be included in the publication of the results. /au/ generally tends to be shorter than the /ai/. Semivowels show weaker F2 than the dipthongal vowel offglide. Diphthongs are characterised by two short steady states, joining with a transition.

5. CONCLUDING REMARKS

1. Telugu has two phonetic diphthongs /ai/ and /au/ (phonologically interpreted as /ay/ and /aw/) agreeing with most frequent types of diphthongs found in the languages of the world. Further, as found in the majority of the languages of the world, the /ai/ type of diphthong is more frequent (i.e. higher percentage of occurrence) than the /au/ in Telugu.

The treatment of what are phonetically falling diphthongs has a bearing on the question of what consonant combinations can occur in Telugu. One analysis proposes that these diphthongs be treated as comprising a short vowel followed by a consonant. They can, however, be equally well interpreted as unit vocalic phonemes on the same grounds as long vowels, where it is more economical to treat them as simple unit phonemes rather than as consisting of two successive vowel phonemes.

Long vowels contrast with single vowels and are structurally analogous. Diphthongs are similar in length to the intrinsically long vowels and are structurally analogous. Therefore the diphthongs can be treated as single unit phonemes, similar to an affricate or an aspirated consonant. Problems arise if one treats the diphthongal offglides as consonants /j/ and /w/, in that this enormously increases the number and variety of permissible consonant combinations. In the analyses of Telugu, we find both kinds of treatment, one with diphthongal offglide and the other as a postvocalic consonant. Though perhaps a case could be made for either of the treatments an integration of the two is surely unacceptable. We do, however, find instances of this kind of inconsistency. For example, Kostic et al., (1977:53) state that "phonetically they are diphthongs (nuclei of single syllables), they can be treated on phonological grounds, as sequences of /a+j/ and /a+w/, respectively". In their transcription of words, they use 'ai' and 'au', but when it comes to listing of consonant combinations the /i/ in /ai/ and /u/ in /au/ have been transcribed as /j/ and /w/ respectively. There is no evidence on spectrogrames to justify their interpretation (for example, see the spectrograme of /irawayyoo/where the first consonant acoustic structure is different from the second.

2. As seen on spectrograms the medial phase explicitly consists of an articulatory trajectory across the formant structure sharing the continuous change in quality. The trajectory moving upwords indicates /ai/, a closing diphthong. There are differences when

diphthongal targets are joined. /au/ has significantly shorter diphthongal targets than the /ai/.

3. The distributional characteristics of Telugu semivowels are not always consistently maintained between speakers of different dialects in different styles. For example, the word /baawi/ may be pronounced as /baayi/ 'well'.

4. Diphthongs are about the same duration as the long vowels. Both the elements of the diphthongs (i.e. targets) are of equal duration unless it is emphasised.

5. Diphthongs are acoustically characterised by slower transitions whereas semivowels by faster transitions.

6. Front closing diphthong has longer transition than the back closing diphthong.

7. F1 is low for both /y/ and /w/. F2 distinguishes /y/ from /w/ in that F2 is high for /y/ and very low for /w/.

8. There is a slight difference between semivowel and diphthongal offglide.

9. Diphthongs have same phonetic tendencies as simple vowels. For instance, diphthongs tend to be nasalised adjacent to nasal consonant and have lengthening and reductions in duration depending on the factors such as emphasis, boundary phenomenon, etc. In emphasis, both the elements of a diphthong are lengthened.

10. It was observed that the child may pronounce the diphthongs as long vowels. For example /gautam/ 'name of a boy' is pronounced as /gootam/.

There are several important theoretical issues that need to be discussed further and resolved as the interpretation of diphthongs has given rise to differences of opinion among Telugu linguists. From phonological point of view diphthongs pose many

interesting problems. Semivowels and diphthongs undergoing dialectal, historical and morphemic changes need to be further explored. The temptation to classify diphthongs as separate phonemes (parallel to vowels) for Telugu, based on Sanskrit tradition. Since there exists separate graphemes for /ai/ and /au/, they must be examined taking various kinds of theoretical approaches. Semivowel being treated as approximant, 'resonant' or 'frictionless continuant, need further discussion as some of them refer to wider concepts.

Acoustic phonetic study of segments under investigation and their phonological interpretation make useful contribution not only to educational perspectives but also to speech technology in particular. Certain acoustic features correspond to the articulatory features, and in turn the acoustic features such as duration and formant frequencies are the basis for the perceptual distinction of one segment from another by a listener. Further, the amount of detail that could be included in a transcription contributes to phonological theory a great deal. Correct representation has direct reflection of pronunciation leading to teaching of a language and to preparation of pronunciation dictionaries etc. Therefore, the research findings of this project will be brought out as a separate monograph which could be used as a model for the description of those sounds in other Indian languages.

TABLE 2 Utterance - initial vowel onset and steady-state formant centre frequencies and duration in CS (Centi Seconds)									
		F1		F2		F3		Average duration in CS	
Vowel Type	No. of tokens	Average onset	Average Steady -State centre	Average onset	Average Steady -State centre	Average onset	Average Steady -State centre	Vowel Onset	Vowel steady-state
I	2	400	500	2350	2250	3000	3000	4.5	5.5
E	2	400	550	2250	2100	2750	2750	4.0	6.0
A	4	750	750	1300	1400	2987	2900	2.5	7.0
O	3	350	500	870	1200	2725	2550	4.0	7.0
U	2	350	450	800	850	2750	2650	4.0	5.0
ii	4	300	300	2525	2425	3150	2950	9.0	32.0
ee	3	450	500	2250	2200	2800	2800	5.0	38.0
aa	4	750	730	1200	1180	2780	2800	6.0	33.0
oo	6	450	450	750	700	2750	2680	7.0	30.0
uu	7	300	350	750	700	1700	1750	8.0	40.0

wacwa 'uncle'   maːya 'illusion'
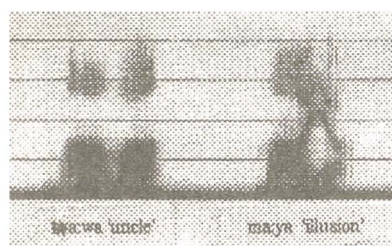
Fig. 1
Spectrograms illustrating the contrasting short
Semivowels /y/ and /w/ of the language.

mainam 'wax'   mainam 'silent'
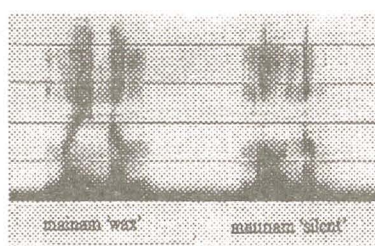
Fig. 2
Spectrograms illustrating the contrasting
diphthongs /ai/ and /au/ (or /ay/ and /aw/.

awunu 'yes' aunu 'yes' ayidu 'five' aidu 'five'
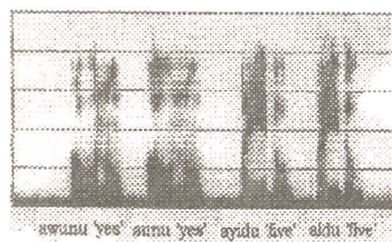
Fig. 3
Spectrograms illustrating the alternative
pronunciation of the diphthongs with
and without semivowel intrusion.

awwa 'grand mother' ayya 'father'
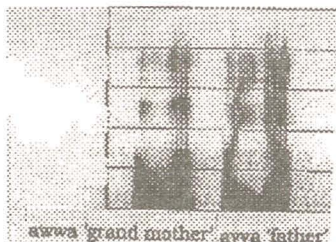
Fig. 4
Spectrograms illustrating the Contrasting
long semivowels /yy/ and /ww/

kowwu 'fat'   koyyi 'cut'
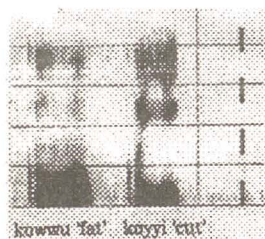
Fig. 5
Spectrograms illustrating the semivowel
/y/ before /i/ and /w/ before /u/ which were
described as articulatorily similar segments.

mupphai 'thirty' arawai 'sixty' arawayye 'sixtieth'
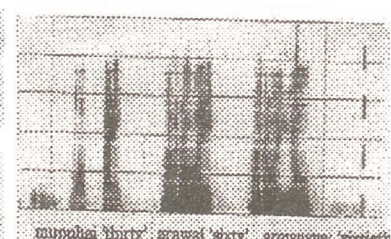
Fig. 6
Spectrograms illustrating word-final diphthong
/-ai/ and its representation in Sandhi as /-ay-/.

II. A Report of the Major Research Project on **"Acquisition and Loss of Lexical Anaphors and the Dative Subject in Telugu and Dakkhini"** based on the research carried out by the Principal Investigator: **Dr. A. Usha Rani** Osmania University; Co-investigators: **Dr. K.V.Subbarao,** Delhi University and **Dr. Barbara Lust**, Cornell University, USA.

A preliminary report along with the proposal has been published in *Osmania Papers in Linguistics* Volume 22-23, 1996-1997 a combined special volume on Applied Psycholinguisitcs. The project has been funded by the UGC and carried out at the Department of Linguistics, Osmania University.

V.Sailaja, Ph.D. research scholar and Sri Vidya, M.Phil research scholar of the Department assisted in collecting the data on dative subject from Telugu children.

V. Sailaja has actively participated and associated herself from the commencement until the end of the project. Many papers presented at seminars/conferences which emerged from the project were jointly presented by Principal Investigator and V.Sailaja. Constant academic help was there from the Co-investigators. Three papers emerged from the data collected on datives from Telugu children. They are as follows:

1) Dative constructions in Telugu children's speech by V.Sailaja and A.Usha Rani presented at the International Conference on South Asian Languages (ICOSAL-II) January 9-11, 1999, Department of Anthropological Linguistics & Punjabi Language, Punjabi University, Patiala.

2) Dative subject in Telugu children's speech by A.Usha Rani & V.Sailaja presented at the National Seminar on Dravidian Linguistics: Diachronic, Synchronic and Applied Perspectives, Department of Linguistics, Osmania University, February 19-20, 1999.

3) Productivity of Dative in Telugu children's speech by A. Usha Rani presented at the International Conference SALA held at Urbana-Champaign, USA, Department of Linguistics, July 9-11, 1999.

Methodology is the same for all the papers mentioned. The methodology is cross sectional-cum-longitudinal.

Subjects: The age range of children selected in this study is from 2 to 5 years. The age difference between each subject is one month. 36 children have been taken for this study. Imitation task is used to imitate or repeat the target utterance immediately after the investigator produced it. Care has been taken to produce the target sentence only once and clearly so that the child could repeat it as he/she comprehends it. If the child repeated the sentence totally then it is regarded as correct response. If the child could not repeat the sentence totally or partially where the dative marked constituent dropped off, then it is regarded as a total drop or no response. The data utilised for the first paper i.e. 'Dative constructions in Telugu children's speech' is taken from the fourth study. All the studies have been illustrated in the previous report. The fourth study has been modified which is as follows:-

Study IV

A—————————————————B

Conjoined structures	non-conjoined structures
a.[basic order]	c [basic order]
b.[scrambled order]	d [scrambled order] 1.
	e [scrambled order] 2.

The following are the examples which show a and b of conjoined structures and c,d & e of non-conjoined structures.

1.a. *vaaḍikii*   *niikuu*   *ennoo*   *paaṭalu vaccæyi*

　　he+dat　　you+dat　　many　　songs　　came

'He and you know many songs'

2.b. ennoo	paaṭalu	niikuu	vaaḍikii vaccǣyi
D1	D2		

3.c. naaku	ippaṭiki	manci	pennu	dorikindi
I+dat	now+dat	good	pen	found

'Now I found a good pen'.

		D2	D1	
4.d. manci	pennu	ippaṭiki	naaku	dorikindi
D2			D1	
5.e. ippaṭiki	manci	pennu	naaku	dorikindi

The fourth study has been designed to test both conjoined NP structures and non-conjoined NP structures with basic and scrambled orders. This study tries to explore the order of constituents marked for dative case, manifesting similar or different semantic relations.

(1) Type-A: the lexical dative case marker occurs with different nouns denoting identical case relation (conjoined NP structures).
(2) Type-B: The dative case marker occurs with different nouns denoting different case notions (non-conjoined NP structures).

Data: Data consists of type A and B sentences. Each type is represented by three sentences. Each sentence has two arguments marked by dative marker.

Type A sentences are as follows:

6) vaaḍikii	niikuu	ennoo	paaṭalu	vaccǣyi
he+dat	you+dat	many	songs	came

'He and you knew many songs'

7) amma	naakuu	niikuu	caakleṭlu teccindi
mother	me+dat	you+dat	chocolates brought theme

'Mother brought choclates for me and you'.

8) *naanna*   *tammu ɖikii*   *niikuu*   *bommalu teccæɖu*

father   younger+dat   you+dat   toys   brought
         brother   theme

'Father brought toys to younger brother and you'.

The dative marker ki manifests the experiencer relation in sentence-6 and recipient relation in (7) and (8).

Type B sentences are as follows:

9)   D1   D2   Theme   verb

naaku   *ippaʈiki*   *manci*   *pennu*   *dorikindi*

I+dat   now+dat   good   pen   found

'I found a good pen now'.

10)   D1   D2   theme   verb

ammaku prati   *maaʈaku*   *koopam wastundi*

mother+dat every   word+dat   anger   gets

'Mother gets angry for every word'.

11)   D1   D2   theme   verb

naannaku   *ve ɭɭaɖaaniki kaaru*   *undi*

father+dat   to go+dat   car   is

'Father has a car to go'.

In sentence (9) the dative marker labelled as D1 manifests benefactive relation and D2 manifests temporal relation followed by the theme *manci pennu* 'good pen' which is followed by the verb *dorikindi* 'found'.

In sentence (10) the dative marker labelled as D1 manifests experiencer relation and D2 manifests causal relation followed by theme *koopam* 'anger' and verb *wastundi* 'gets'.

In sentence (11) the dative marker labelled as D1 manifests possessive relation and D2 manifests purpose relation followed by the theme *kaaru* 'car' and verb *undi* 'is'.

Each target sentence of type A is given to the subjects to repeat in basic word order and scrambled order which are illustrated in the fourth study.

There is a marked preference for unmarked word order than marked word order in the elicitation of type 'B' constructions where the lexical dative case marker performs various kinds of semantic case relations. 4.0-5.0 age group children preferred to move the adverbs with *ki* dative case markers in sentences 9, 10 and 11. They also preferred to omit such adverbs in the above mentioned sentences.

The third paper i.e. 'Productivity of dative in Telugu children's speech' deals with 4 case relations (D1 relations). The test administered for this paper consists of twelve sentences. For each case 3 sentences were given to the subject. The four case relations were recipient, benefactive, possessive and experiencer. Here each sentence has one argument marked by dative marker. The sentences are as follows:

12) Recipient: *neenu*   *vaa ḍiki*   *pennu*   *iccænu*

              I   he+dat   pen   gave

              'I gave a pen to him'.

13) Benefactive: *waa ḍiki* *ninna*   *praiz*   *vaccindi*

              he+dat yesterday prize   came

              'He received a prize yesterday'.

14) Possessive: *niiku*   *reṇḍu*   *kaarlu*   *unnaayi*

              you+dat two   cars   have

              'You have two cars'.

15) Experiencee: *aameku baagaa jwaram vaccindi*

               she+dat   high   fever   came

               'She has high fever'.

In sentence (12) the dative marker manifests recipient relation while the dative marker represents benefactive relation in sentence (13). In sentence (14) the dative marker manifests possession relation. Finally, in sentence (15) the dative marker expresses experiencer relation.

The findings of the third paper where the 4 case relations (D1) are taken into the data show that the performance of all the four case relations by the children is good. The difference in percentages is not much.

The movement or deletion of adverbial dative marked constituents by children and the better performance of D1 relations in both the papers conclude that the D1 relations are prior to D2 in the acquisition order. The emergence of the dative case marker in Telugu children's speech reported by Sailaja (1989) also show only D1 relations like recipient, experiencer, benefactive and possessive in a specific order. There is no trace of D2 relations like *ippatiki* in the following sentence

D1   D2

naaku   ippatiki   manci   pennu dorikindi

which substantiates the better performance of D1 relations by the children. We can conclude that the dative in Telugu, showing two types of constructions A & B behave differently in the early syntax. This can be attributed to their formal differences and semantic complexity. It is obvious that 'B' type constructions were performed poorly by these children as they are exhibiting semantic as well syntactic/formal complexities in the study.

The aim of the last paper i.e. 'Dative subject in Telugu children's Speech' is to explore whether there could be any hierarchy in the acquisition of dative marker that occurs with the so-called dative subject and with the indirect object.

The data utilized for this paper is taken from Study I. Two types of constructions are selected for the present study. They are A & B. A is dative and B is nominative construction. Six sentences a re taken for A type. Among the six sentences three sentences where dative is in [+exp] relation. Sentences are listed in Study I.

16. *waaḍiki*   *tala*   *noppi*   *vaccindi*

    he+dat   head   pain   came

    'He had headache'.

Other three sentences where data is in [-exp] relation like

17. *aameku*   *raayaṭam vaccindi*

    she+dat   write   knows

    'She knows to write'.

Six sentences are taken for 'B' type. Among the six sentences, three sentences where nominative is in [+exp] relation like

18. *neenu*   *entoo*   *koopangaa unnaanu*

    I   very   angry   am

    'I am very angry'.

Other three sentences where nominative is in [-exp] relation. Here the indirect object is marked by the dative marker which is as follows:

19.	neenu	ce ṭṭuku	nii ḷḷu	poṥænu
	I	tree+dat	water	pour

'I watered the plant'.

Even though the performance of D1 relations of the dative marker are better performed, this paper shows some distinction in the production of the dative case marked arguments showing different D1 case relations.

Dative case as [experiencer] on affected argument called dative subject showed more productivity like eg.20a over the other where the object is marked on Indirect object like eg.21b.

20a.	naaku	caalaa	aakali	veestoondi
	I+dat	very	hungry	feel

'I am very hungry'.

21b.	waaḍu	bukkuku	aṭṭa	weeṥæḍu
	he	book+dat	cover	put+PNG markers

'He has covered the book'.

III. A Report of the Research Project on **"Role of Phonology and Orthography in Beginning Reading with Reference to Telugu"** based on the research carried out during the year 1999 - 2000 by **Dr. D. Vasanta**.

1. BACKGROUND

Existing models of visual word recognition based on English language assume that atleast three different domains of representations, viz., orthography, phonology, and semnantics play an important role in recognizing words presented in isolation. While there exists some consensus on the fact that the knowledge about phonology of a word helps the subject obtain a faster access to its meaning, there is limited information on how phonology influences orthographic processing itself. However, it has been established that one's performance in a lexical decision task requiring the subject to report whether a given string of letter is or is not a word is said to depend among other things on the word frequency effects. Whether or not phonology has a direct influence on orthographic reprsentations will also depend upon the hearing status of the subject such that the prelingually hearing impaired may pay more attention to the visual or orthographic information of a word rather than its phonology irrespective of the task demands. Further, it is also likely that the nature of the script of a given language facilitates or inhibits the influence of phonology in visual word recognition.

Drawing on some of the recent debates in the beginning reading research based both on normal hearing and hearing impaired English speaking chidldren, the present study was undertaken, as part of a larger project to understand the processes underlying visual word recognition and comprehension abilities of Telugu speaking children.

2. METHOD

Subjects

Thirty children in the age group 7-10 years participated in this study. All the subjects spoke Telugu as their native language and they were all enrolled in a school located in the suburbs of Vijayawada. The medium of instruction in this school is Telugu from nursery to standard IV and is English from standard V on wards. Ten children were chosen randomly from each of Classes II, IV and V. Each child was tested individually in a quite room in the school premises.

Test materials

Orthographic processing

A set of fifty pictures of common objects, animals, numbers and body-parts were generated from the database of a computer. Using the Desk-Top Publishing (DTP) software (Adobe pagemaker) Telugu letters corresponding to the words referring to each of the target pictures were generated. Similarly incomplete sentences in to which one of the target word fits were also generated on the computer. The computer processing of the Telugu materials ensured uniform print quality and font size.

There were three tasks within the orthographic processing task: initial syllable prime task consisted of 25 pictures arranged in a column with the initial syllable of the word corresponding to each picture given next to the picture and the subject had to provide the second syllable; the final syllable prime task consisted of providing the second syllable next to the picture (there were 25 pictures) and having the child write the first syllable ; providing orthographically similar non-rhyming words (e.g. buTTa `basket' - baTTa 'cloth') and have the child complete an incomplete sentence by selecting one of the two words given next to it. There were 25 such sentential stimuli.

Phonological processing

A rhyme judgement task consisting of 25 items was used to assess subject's ability to indicate whether a given word pair rhymes (e.g. balli 'lizard' - malli 'jasmine') or does not rhyme (e.g. balla 'table' - ba:lu 'ball'). The subject was asked to mark a tick mark next to the word pair if they were rhyming and a [x] mark if they were not. The second sub-task consisted of rhyme generation in which a target word was given in writing. The subject was encouraged to read it and give another meaningful word that rhymes with the target word. There were 25 items in this task. Finally, the sentence completion task consisting of 25 incomplete sentences required the subject to read a pair of orthographically similar and rhyming words (e.g. pennu 'pen' - wennu 'spine') select the appropriate word to complete the target sentence by writing the chosen word.

Practice tasks

Before beginning the data collection, each child was given detailed written and oral instructions about each task and several practice items under the two main tasks - orthographic and phonological processing. The criterion for inclusion in the test was 75% on the practice items. Not only the children met this criterion, they participated in this study very willingly.

Administration of the various tasks

Separate data-booklets were prepared for each subject. Of the ten subjects within each grade, five of them took orthographic processing task first and then phonological processing task whereas the order was reversed for the other five. At first, each subject was required to identify by naming the computer generated picture stimuli, take part in the practice tests and then take the experimental tasks. The data collection began with standard -V children, followed by standard - IV and then, standard -II. As mentioned earlier, each child was tested individually in a

single session lasting from 20 minutes to one hour.

Scoring of the responses

The performance was assessed for both accuracy (per cent correct) as well as latency (in milli seconds). The latter was done using a stop watch worn by the experimenter who noted time taken to complete each of the six tasks under the two main tasks by each child. Only the rhyme judgement sub-task was scored using a right-wrong criterion with one mark for a right response and a zero for a wrong response. For all the other tasks, a three-way scoring system was used such that the subject scored 1.0 for a correct spelling; 0.5 when a secondary grapheme is missing; and 0 if a wrong grapheme was used resulting in a non-word. Thus for instance a word like rekka 'wing' received a score of 1.0 when the two syllables were spelled correctly; a response of reka got a score of 0.5 and regga was scored as zero. The same system was followed for sentence completion tasks as well. Time taken for each of the six sub-tasks was noted by the experimenter initially in milliseconds and converted into seconds later for ease of interpretation. The raw scores are displayed in Table - 1:

3. RESULTS

Measures	ORTHOGRAPHIC CODING TASK			PHONOLOGICAL CODING TASK		
	Sy.Initial Prime	Sy. Final Prime	Sentence Completion	Rhyme Judgement	Rhyme Generation	Sentence Completion
2nd standard children n = 10;				average age= 7.06 years		
Latency Minutes	3.71	4.84	18.74	5.38	21.79	9.41
Accuracy %	87.8	86.4	85.2	93.2	77.6	88.2
4th standard children, n = 10;				average age = 9.15 years		
Latency Minutes	1.95	2.33	5.35	1.98	10.65	5.73
Accuracy %	95.6	95.6	98.4	98.8	85.2	98.8
5th standard children, n= 10;				average age = 10.05 years		
Latency Minutes	1.87	2.32	5.02	1.60	10.2	5.32
Accuracy %	95.2	93.6	96.8	95.2	82.8	97.6

Table - 1 : Performance of subjects in the various tasks

Interpretation of the results

It is evident from Table - I above that there is little, if any, difference in the performance of children in the top two grades i.e., standard IV and V. In fact, in many of the tasks, the performance of standard -V children was slightly lower than that of standard -IV children. The accuracy measurements revealed that the performance of these two groups of children is very close to the theoretical maximum of 100 per cent. This may mean that they have reached an asymptote as far as beginning reading and

spelling abilities at the word level are concerned by standard IV. However, it must also be noted that in standard V, the children in this school are switching over to English medium. It is possible that their performance is slightly lower than that of children in standard IV because they don't write or read Telugu as much as they used to. More data are needed from Telugu medium standard V children to verify this. The main findings are summarised below:

1. Subjects from all the age / grade groups took longer time to spell in the 'second syllable prime' condition compared to 'first syllable prime' condition suggesting that initial syllable of a word does facilitate faster access to orthographic representation of that word compared to the second syllable.

2. Judging whether a given pair of words rhyme or do not rhyme is much easier than generating a word that rhymes with a target word. While this is true of all the subjects, those belonging to the youngest age group found it particularly difficult to generate rhymes. This is evident by the fact that they took double the amount of time taken by children from standard IV and V.

3. In the comprehension tasks (sentence completion), the younger children from standard II displayed a preference to phonological coding over orthographic coding in that on the average, they took only 9.41 minutes to complete the 25 sentences under phonological coding task whereas they needed 18.74 minutes for similar task involving orthographically similar nonrhyming words. This suggests that they have not yet mastered the orthographic representations of even common words. That this is so is seen from the fact that children belonging to standards IV and V displayed little, if any difference in the latency measures under sentence completion tasks of the two main tasks, viz., phonological vs. orthographic coding. This finding can be interpreted to mean that a word's phonology may not have a facilitating role once the mastery is achieved over its orthography.

4. The performance of the youngest children (in standard II) is consistently lower than those in the higher grades both in accuracy and latency suggesting that significant developments (in both motor and cognitive domains) take-place during the age range 7-9 years.

5. It was only the younger children in standard II, and not the older chidlren who were articulating the stimulus materials as they were reading and spelling - this observation corroborates the finding that phonology has an important role to play in providing access to semantics (via orthography) during the early stages (below the age of 7 years) but not later. It is also during these years that children are exposed to rhymes and other phonolgical awarenss games and activities both at home and in school.

4. CONCLUSIONS / DIRECTIONS FOR FUTURE RESEARCH

This study, preliminary as it is, suggests that it is only during the nursery school and the first two years of schooling that children become sensitive to the phonological characteristics of words spoken around them and it is at this time they make full use of this knowledge in tasks involving beginning reading and spelling. Once they reach the peak of their motor development, and have mastered the principles of orthography of the language in which they are receiving instruction, they tend to rely less on phonology to access orthographic representations. They can achieve direct lexical access when they see a frequently occuring (commonly used) word. They also become adept at distinguishing orthographically similar words and keeping aside their differences in meaning. It must also be noted that phonology has insignificant place in the pedagogy after the nursery school or atleast after grade II and hence it has little or no consequence in help achieve lexical access atleast for normal hearing children.

The hearing impaired children enrolled in normal schools may use different information processing strategies because, in view of their impaired hearing ability, they may continue to pay

more attention to the word's orthography relative to its phonology. Again, more information is needed on the role of script in the beginning reading and spelling instruction. Would the syllabic / semi-syllabic script associated with most Indian languages push the children to draw more on the orthographic representations compared to English characterised by alphabetic script? What happens to bilingual / biliterate normal hearing children in tasks involving beginning reading and spelling in both the languages? What processes underly reading and spelling of nonsense words (which do not have lexical representation) and words with complicated syllable structures? These and many other questions must be investigated for they have a great deal of pedagogic implications.

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